The Electrical Industry's Weekly Magazine

June 18, 1956

Electrical World

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TRAINED RAIN IN SPAIN

BOOSTS HYDRO OUTPUT... PAGE 24

Appliance Servicing:
What can the utility do?... Page 46

R B POWER
VERSITY MICROFILM IN
GS W 12

PRESIDENT KINSEY ROBINSON PARTICIPATES in program to keep customers informed. Both management and employees take active part in public relations activities.

Year's outstanding public relations performance wins Coffin Award for Washington Water Power

HUNDREDS OF FILM SHOWINGS help public to understand the Washington Water Power story. Questions and discussions follow the well-attended film presentations.

As the recipient of the 1955 Charles A. Coffin Award, presented by the Edison Electric Institute, the Washington Water Power Company was cited for "... enlightened leadership ... for winning and holding ... the friendship and goodwill of its customers and other people of the area."

Through vision and practicality, and through vigorous leadership, WWP achieved success for the third time, having been named winner of the award for 1939 and 1949. Their continuing use of effective public relations tools includes film showings, discussion groups, and even the launching of a children's drawing contest. President Kinsey Robinson of WWP, others at management level, and employees are well known throughout the area for their active participation in this public relations campaign. In addition to keeping residents of their service area constantly informed, WWP is concentrating on continuing to improve service, lower costs, and build load. Such spirited action typifies the electric utility industry's alertness to its responsibilities.

The General Electric Company congratulates the Washington Water Power Company. General Electric Company, Schenectady 5, New York. 301-331

MORE POWER TO AMERICA

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Electrical World

Published for 82 years for those engaged in the business of generating, transmitting, distributing, or applying electric power

VOL 145 No 25 **June 18, 1956**

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• • •

COMING NEXT WEEK—What was said at the recent Edison Electric Institute convention? EW will provide the answer in a 21-page section. In addition an interview will introduce the new president, Donald S. Kennedy, to the industry.

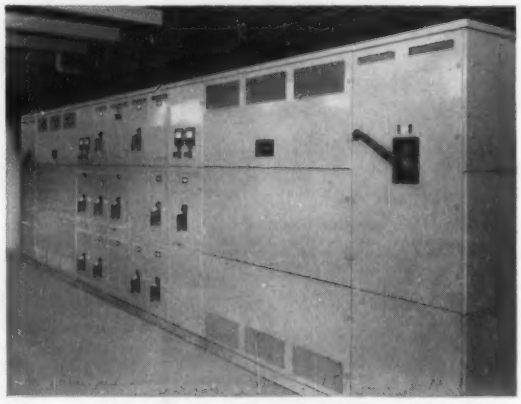
Wagner TRANSFORMERS... the choice of leaders in industry

Wagner Unit Substation Transformers supply power for new IBM plant...

At IBM's new Kingston Military Products Division plant at Kingston, New York, electricity and automation work together to increase output per manhour and to increase output per unit of plant area. The factory itself is the latest in modern manufacturing plant design and utilizes the modern load center scheme of in-plant electrical distribution.

The unit substations in this plant are equipped with Wagner dry-type Transformers because Wagner transformers are carefully engineered to meet heavy industrial demands—built to stand up under rigorous twenty-four hour a day production schedules. Wagner pioneered in the development of dry-type load center transformers, and the Wagner design is known for its great mechanical strength and electrical stamina.

Wagner unit substation transformers can answer your power needs just as they do at IBM. Choose Wagner for your next load-center installation. Consult the nearest of our 32 branch offices or write for Bulletins TU-205 and TU-214. They give full information on Wagner Unit Substation Transformers for industrial power distribution systems.



IBM uses this double-ended Wagner-equipped unit substation to supply power for lighting and other loads.

...to help America LIVE BETTER—*Electrically*

LIVE BETTER ELECTRICALLY

Wagner Electric Corporation
6456 Plymouth Ave., St. Louis 14, Mo., U. S. A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

WT56-7

EDITORIALS

Watch the Summer Peaks

The crucial test draws near for utilities which have bolstered their systems for another summer peak. Before long they will find out whether their evaluation of air conditioning load was realistic. For almost 1.3 million room air conditioners and at least 125,000 central units have rolled off assembly lines the past 12 months. And most of these will be connected to utility lines ready to run whenever air temperature becomes uncomfortable.

Whether the summer will bring another heat storm, time alone will tell. But when the sun near its solstice pours more heat each day onto a sweltering earth, temperatures are bound to rise. And air conditioning has made utility system loads acutely sensitive to prolonged hot spells.

Utility men everywhere will watch their system peaks this summer. In the Southwest, where 1954's heat storm sorely overtaxed their systems, they may relax a little in the knowledge that tremendous reinforcement has been accomplished. In cities of the Northeast, where the 1955 sun roasted cables under blistering pavements, they will be thankful that correctives are being applied. But will the heat this summer find another vulnerable area?

Now is the time to set up test schedules to measure summer conditions. Utilities which have already bolstered their systems will test for weak points they may have overlooked. Those which have not experienced a heat storm will want data to warn them of impending danger.

Knowledge of load requirements and how to serve them is the cornerstone of utility engineering. Changing conditions call for new factors in this knowledge. The weeks ahead offer opportunity to explore the characteristics of air conditioning load. When this has been reduced to the same terms as other loads, systems will be engineered as adequately for summer as they have been for winter peaks.

Build the Winter Loads

Ten days ago some 80 representatives of the press filed into a New York hotel for what their invitations described as a "highly informative and newsworthy afternoon."

The event: An electric house heating press conference—the first to be staged by National Electrical Manufacturers Association's 19-member Electric House Heating Equipment Section. Judging by the interest generated and coverage it is getting, the affair lived up to its advance billing.

Section Chairman R. E. Pequignot told the group of promotional plans to boost the number of electrically heated homes to 3 million in the next ten years. After the premiere of the Section's new sound-slide film (EW, April 16, p 154), guests were ushered into a room full of heating equipment displays where they looked, asked questions, and made notes.

One newspaper man, when told electric heating could jump a home's yearly consumption from 2,800 kwhr to something like 9, 12, or 15,000 kwhr, was visibly impressed. "Talk about growth potential," he exclaimed, "with this stuff your whole industry could literally take off."

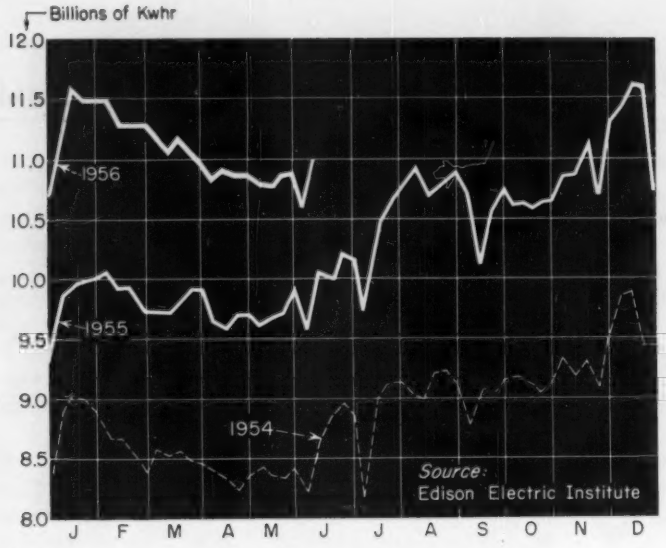
But apart from alerting the nation to electric heating, the press conference had another significance. It signaled a turning point in the industry's own internal relations. Instead of fighting with one another for the bare scraps of the house heating market left by gas, oil, and other competitive giants, manufacturers—the NEMA members at least—are showing signs of presenting a united front, of hunting for bigger game.

To the power supplier this fact has vital implications. Manufacturers are now in a position to amplify the efforts of those utilities which already have laid the groundwork for greater house heating market development. To achieve 3 million homes by 1966 would mean a ten-fold boost in the number that exists today. Powerwise it would mean 16 to 27 billion kwhr in added load.

In keeping with the new dimensions that electricity is assuming in house heating and year-round climate control, Electrical World next week will begin a regular bi-weekly department devoted exclusively to electric heating; its sister load, air conditioning; and the heat pump. It is hoped that this new department will help speed the day when homes heated and cooled by electricity will be counted not in the hundreds of thousands but in millions and tens of millions.

ELECTRICAL WEEK

LAST MINUTE



OUTPUT

Week ended June 9
10,951,000,000 Kwhr
Up 9.1%

Atomic Energy Commission requirements — 1,125,000,000 kwhr (Electrical World estimate). Excluding AEC, output increase was 6.6%

Per Cent Change From Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
June 9	+9.1	+8.6	+5.0	+11.0	+9.9	+7.7	+14.3	+10.5	+15.5	+4.1
June 2	+11.1	+8.1	+6.4	+15.1	+10.2	+9.7	+17.2	+11.2	+12.2	+7.3
May 26	+9.5	+7.3	+2.6	+13.0	+8.4	+9.4	+14.4	+13.5	+10.6	+7.5

Seasonally Adjusted Index 212.9 Week Ago 213.7 Year Ago 195.8

Issue's Highlights . . . Robert Moses seizes upon Niagara rock slide to call for Congressional mandate enabling New York State to build single, large, "protected" power plant at Niagara Falls . . . Republican minority of Chudoff subcommittee attacks majority report accusing Administration of fostering "private monopoly" in electric business . . . Yankee Atomic Electric gets green light for 134-Mw atomic plant . . . Under EEI's banner, electric utilities fight for bigger role in nuclear power development.

Mysterious tripout of 207,000-kw unit at State Line Station caused Commonwealth Edison to lose all interconnections and forced dropping of 100,000 kw of load between 11:20 AM and 12:30 PM on June 12, company said. Generation at time was 3½ million of system's 3.9 million kw. Some 400,000 kw was out for maintenance. Undamaged unit was returned to service.

70-Mva aluminum-wound transformer goes on the line for Aluminum Co of Canada at its Kitimat, British Columbia, smelter. The 3-phase, 60-cps, 275/13.2-kv, oil-filled transformer is wound with 42 miles of aluminum conductor. Design features of the unit are described on page 55 of this issue.

Boston Ed promotes Charles F. Avila from president's assistant to vice president of engineering and construction. He succeeds late C. A. Corney.

Miami City Commission raises electric utility tax on Florida Power & Light's customers from 7% to 10% on bills up to $25. From $25 to $100, tax remains at 3% . . . **A bill to repeal 2% state tax** on generation and sale of electricity is introduced into Louisiana Legislature.

Bonneville Power Administration dedicates Chief Joseph Dam on Columbia River. The project is planned for eventual rated capacity of 1,743,000 kw.

NEWS OF THE INDUSTRY BRIEFLY TOLD

Washington Wire . . . Justice Department asks U. S. Court of Claims for additional 30 days **to file answer to Dixon-Yates claims** for about $3 million spent under cancelled contract . . . President requests supplemental appropriation of $500,000 to enable Southeastern Power Administration **to pay Georgia Power for wheeling Clark Hill power** to preferred customers.

Securities and Exchange Commission forms single branch of public utility regulation in its Division of Corporate Regulation. The new branch, under direction of Assistant Director Solomon Freedman, will handle work under Public Utility Holding Co Act of 1935 . . . Atomic Energy Commission announces plans for **gas-cooled power reactor experiment** at National Reactor Testing Station in Idaho. The $4-million test is expected to develop data for design of small civilian central station power plants.

Sen R. L. Neuberger (D-Ore.) **aims at FPC's license to Portland General Electric** for Pelton hydro project on Deschutes River by introducing amendment to S863, the bill to redefine relationship of federal and state governments on water law and rights. Amendment calls for suspension of federal licenses for incomplete power projects until licensees comply with state law. Meanwhile, Jefferson County (Ore.) **grand jury rules utility construction of Pelton is not violation of state law.**

John W. Evers, president of Commonwealth Ed, **endorses idea of joint utility-coal industry cost study** and joint research program. He tells National Coal Association that transportation costs should head list of study.

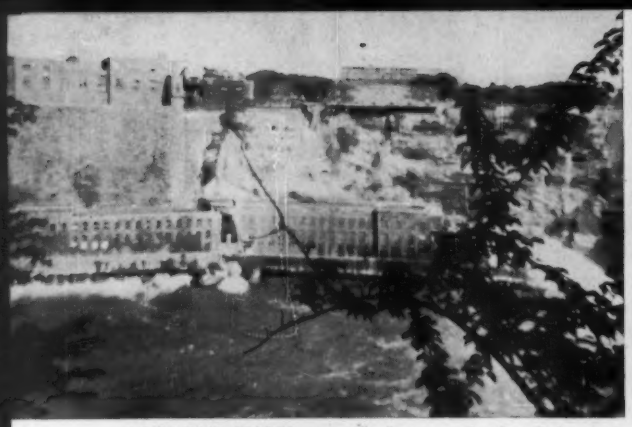
Pacific G&E offers commonholders 812,791 common shares on 1-for-20 basis, record June 12 to expire July 12, at $45 a share to yield 5.33% . . . Halsey Stuart & Co wins $10-million **Indianapolis P&L** first mtge 3⅝% bonds (Aa) due 1986 at 101.22%; reoffers at 101.935% to yield 3.52% . . . Merrill Lynch, Pierce, Fenner & Beane wins 300,000 shares **California Electric Power** common at $14.309; reoffers at $14.75 to yield 4.75% . . . Kidder, Peabody & Co places privately $1-million **Green Mountain Power** 3⅞% notes due 1981 and 100,000 shares **South Carolina E&G** 4.60% cum $50 preferred.

ABOUT PEOPLE IN THE INDUSTRY

As strike at South Philadelphia turbine plant enters ninth month, Westinghouse Electric's Steam Division finds itself in a position where it **can't compete with General Electric and Allis-Chalmers** because of operating inefficiencies, W. C. Rowland, Westinghouse VP, declares. The plant "must get itself into a competitive position if we are expected to remain in business and provide jobs for our employees," he says.

"It is the policy of the State to have **no more federal power plants constructed in Virginia,"** Gov Thomas B. Stanley, Democrat, declares in letter to House subcommittee considering proposal for Corps of Engineers to survey proposed Smith Mountain Dam in Roanoke River Basin. Appalachian Electric Power is willing to undertake the power project, and nothing should be placed in the company's way, the Governor says.

More News About People page 37



ROCK FALL STARTS to crash down on Section B (center) and C (right) of Schoellkopf Station as gorge wall collapses

FALL PROGRESSED from South (right) to North wiping out 234,000 kw of the station's 334,800 kw of capacity

Major Rock Slide Buries Schoellkopf

A massive rock fall in the Niagara River gorge on June 7 completely wiped out Sections B and C of Niagara Mohawk Power Corp's historic Schoellkopf Station. The fall, which took place in a matter of "moments," destroyed 234,000 of the station's 334,800 kw of (nameplate) capacity and left 100,800 kw in Section A flooded under 10 ft of water and in questionable condition. Section A is still standing however.

Depreciated book value of Sections B and C was given as $8 million by company officials who said that for the entire plant it was $20 million including land, canal, tunnel and terminal, and other structures.

The disaster has two possible repercussions:

1. A sharp reduction in the reserve generating capacity of the Upstate New York Power Pool (EEI Region 1 Area 3) which in Dec. 1955 was 8.4% or about 333,648 kw against a winter peak of 3,972,000 kw.

2. Stimulated pressure by public power proponents for action on the Niagara power issue at this session of Congress. Lehman bill is before a House committee.

Robert Moses, chairman of New York Power Authority, called for a mandate from Congress to enable the state to build "a single, large, modern, safe, protected" power plant at Niagara Falls. Commenting on the pending application of the private companies in New York State for a license to build a plant at Niagara, Moses said: "Niagara Mohawk no longer has the remotest prospect" of obtaining a license—even if one was granted "the state, which owns this water, would promptly challenge it in the courts."

Earl J. Machold, president of Niagara Mohawk, said no plans had yet been made either to rebuild Schoellkopf or to restudy existing plans for use of Niagara River waters. "Any decision will depend on the condition of Section A of Schoellkopf now being studied," Machold said. He believed the company's present license to use 20,000 cfs still holds, possibly with amendments. "If the place of use is changed," he said, "it would probably require some change in the license but we have no doubt that our right to the water is clear."

Company officials suggested that cause of the collapse of a 500 ft section of the gorge wall above the station resulted from an earth movement in the area. This was believed to

Vital Statistics on Schoellkopf Station

Section	Built	Units	Rating-Kw	Frequency	Total Kw
A	1905-14	9	8,000	60	72,000
		4	7,200	25	28,800
B	1918-20	3	26,000	25	78,000
C	1921-24	3	52,000	25	156,000
		19	Total Nameplate Rating		334,800
			Total Capability		371,000

Schoellkopf Station was built in three sections identified as A, B, and C. The first section, built from 1905 to 1914 contains 13 units; nine 60-cycle and four 25-cycle, aggregating 100,800 kw. Section B had three 25-cycle units totaling 78,000 kw and was built from 1918 to 1920. Section C had three 25-cycle units totaling 156,000 kw and was the last to be built. Total nameplate rating of all Schoellkopf units is 334,800 kw.

Water is diverted from the Upper Niagara River, above the falls at a point downstream from historic old Adams Station, and flows to Schoellkopf A and B through an open hydraulic canal, and to Section C through a 32 ft tunnel below the City of Niagara Falls.

At the station, water enters a forebay where it flows down through penstocks to the turbines and is discharged into the river 217 ft below the forebay.

DUST AND SMOKE rises from wreckage as huge chunk of gorge wall with tree and hedge falls on Section B below

WATER FLOWS over wreckage through ruptured penstocks from terminus of the canal and tunnel at top of gorge

Power Station

have resulted in seepage of water from the power tunnel into crevices between the rim of the gorge and the forebay.

A team of geological experts called in with the cooperation of New York's Gov Averell Harriman suggested, tentatively, that the fall had been caused by a minor earthquake. Dr Austin C. McTigue, in charge of the Canisius College seismograph, also took this view. He described it as "just another release of the elastic strain in the earth in this area". Rev J. J. Lynch, S J, seismologist at New York's Fordham University told Electrical World that June 7 was a day of "considerable activity", with a disturbance of definitely "seismic character" being observed at 12:30 PM in the New York State area. Father Lynch said he could not estimate its location.

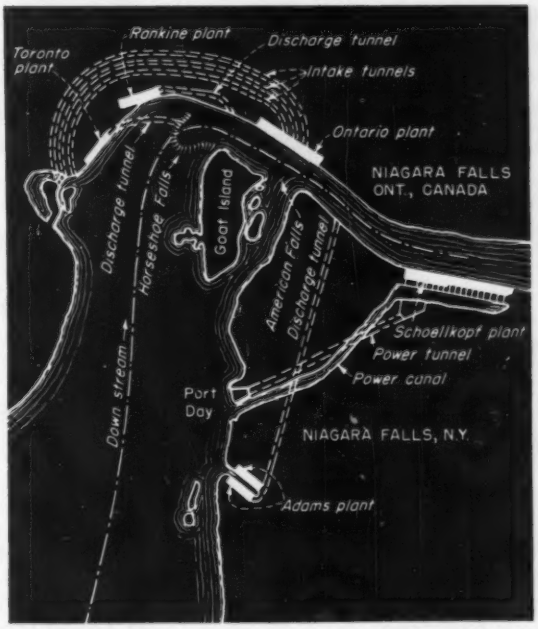
The fall occurred suddenly at 5:10 PM nearly trapping the station's nine operators and a crew of 30 to 35 which had been sandbagging water leakage at the south end of the station. They fled when walls began to crack and windows to pop. All but one escaped by running through the station to the north (toward Section A). The fall began at the south end of Section C and appeared to progress northward.

All 19 generating units were on the line at the time of the slide. Operators were forced to flee the station leaving the machines running. During the slide, turbine generators in Section A, that were undamaged by the slide, "ran away" before they were taken out of service by closing Johnson valves from the top of the gorge by remote control.

Cascading rock ruptured the penstocks leading to Sections B and C. The arrangement of this section made it impossible to cut off the flow of water through them from the canal and tunnel for several days. Flow from the ruptured penstocks ran through and over the rubble flooding Section A to a depth of 10 ft. Steps were taken promptly to unwater the canal and tunnel by means of a coffer dam built at the intake two miles above the falls.

The City of Niagara Falls was without power for about eight hours following the slide. But by 2 AM, Friday, service to all customers was fully restored by drawing on interconnections with Ontario Hydro-Electric Power Commission, New York State Electric & Gas Corp, Rochester

(*Continued on page* 63)



INTAKE two miles above American falls feeds 20,000 cfs to station through open canal and 32-ft tunnel

SECTION A remains but was flooded by water from broken penstocks. Terminal structure (upper right) teeters on brink

Edgar Dixon announced new EEI action program for speeding nuclear power

Max M. Ulrich named full-time secretary of EEI atomic power committee

EEI Pushes Atom Efforts

- Presidents conference called to speed and expand electric company development in nuclear power field
- Board sets up task force to choose promising reactor types, recommend them for industry development
- Sen Gore says U. S. can't rely solely on electric companies to push nuclear power research

The nation's electric companies, under the Edison Electric Institute banner, are moving to assume a larger share of the responsibility for nuclear power development.

Spurred by recent Congressional hearings on the Gore bill (EW, June 4, p 8), which would put the federal government deeper in the nuclear power business, the EEI Board of Directors have adopted a four-point program designed to coordinate and expand electric company efforts. The board voted to:

(1) Establish a technical appraisal task force immediately which will review reactor types and designs, and recommend the most promising for industry research and development.

(2) Endorse the formation of a national evaluation group which would study power reactor types and designs and select those meriting development and construction.

(3) Call a conference of electric company presidents to review the industry's participation in the atomic power program and provide means for an accelerated and expanded scale of operations in this field.

(4) Appoint Max M. Ulrich as full-time executive secretary for the EEI committee on atomic power.

Committee Chairman Edgar Dixon, president, Middle South Utilities Co, announced the board's action, emphasizing that electric companies are already taking a major responsibility for nuclear power development. He pointed out that privately owned utilities are already committed to spend $300 million in the planning, construction, and attendant research for nuclear power plants which together will have an ultimate capacity of more than 1.1 million kw.

Sen Albert Gore, Tennessee Democrat who sponsored legislation for an expanded federal nuclear development program, made this comment:

"I congratulate the utility industry on the statement. I want to encourage all private industry in the field. But the U. S. cannot rely solely on the electric utility industry to develop atomic energy. They have shown no competency in this field." Gore's proposed federal program envisions the construction of six power reactor units of 100,000 kw or larger and a total federal outlay of some $500 million.

Gore declared that the U. S. is falling behind in the international race for nuclear power development.

Lane Says U. S. Leads

James A. Lane, head of reactor engineering of the Oak Ridge National Laboratory, took partial exception to the Gore comment. In a speech before the American Nuclear Society meeting in Chicago, Lane said that Britain and Russia do propose more nuclear capacity by 1960 than does the U. S. But on the basis of numbers of reactors already built or projected by 1960, the U. S. not only leads these two countries, but these two plus all others, Lane said.

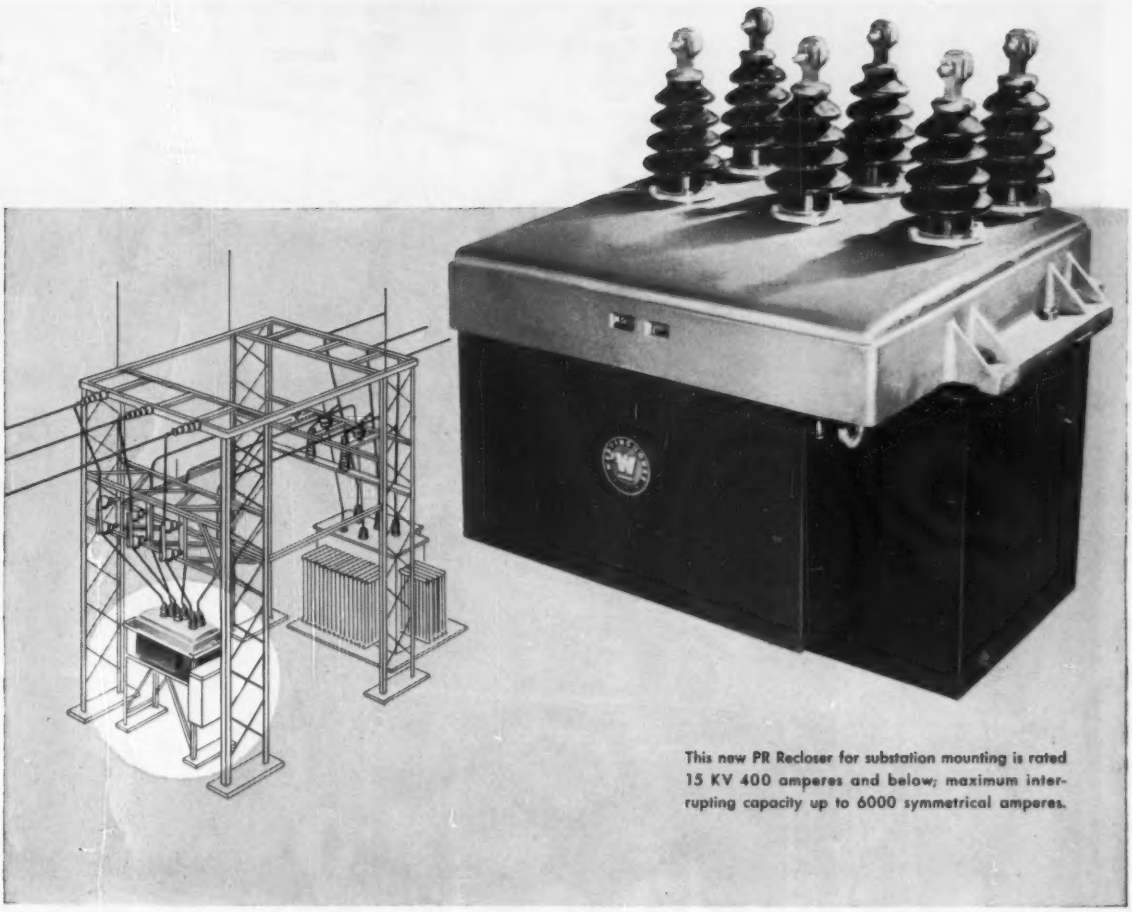
EEI's technical appraisal task force is to be made up of independent nuclear engineers and scientists, and executives of both EEI member companies and equipment manufacturing companies. Chairman Dixon said the industry hopes to draw upon the best talent available from all related branches of nuclear science to man this task force.

The national evaluation group, endorsed by the EEI board, would provide a continuing means for scientific, engineering, and economic evaluation of power reactor types and designs.

Company Presidents Will Meet

Electric company presidents will meet within 90 days to determine additional actions commensurate with the policy adopted by the EEI board.

Ulrich, designated full time secretary of the EEI atomic power committee, is an honor graduate of West Point Military Academy and holds an MS degree in civil engineering from Massachusetts Institute of Technology. Previous to joining the EEI staff in 1954, Ulrich was assigned to the office of the Chief, Corps of Army Engineers, working on long range planning. He is a native of Kokomo, Ind., but moved with his family to St. Petersburg, Fla., when he was quite young. He is married to the former Miss Mary Ellen Fisher of Belmont, Mass. They have one son, Max Dwight, who is two years old.



This new PR Recloser for substation mounting is rated 15 KV 400 amperes and below; maximum interrupting capacity up to 6000 symmetrical amperes.

NEW automatic recloser

. . . inexpensive protection for growing substation loads

Here's a packaged bargain for your distribution system in the substation or out on the line.

First of all, the new PR recloser provides 2-3 cycle, high-speed opening, and fast, efficient power restoration. This means, too, much greater protection than ever before against line burn-down. It's all completely automatic . . . real assurance of service continuity on your system.

Second, the package unit is especially built for reduced installation and operating costs . . . shipped frame mounted, wired, tested, ready to be put on the line.

Third, many circuit breaker features are built into the new PR recloser . . . proved condenser bushings, multi-ratio bushing current transformers for ground trip and load indicating metering and other relay functions, dependable motor reclosing, in addition to the time-proved Westinghouse De-ion® interrupters.

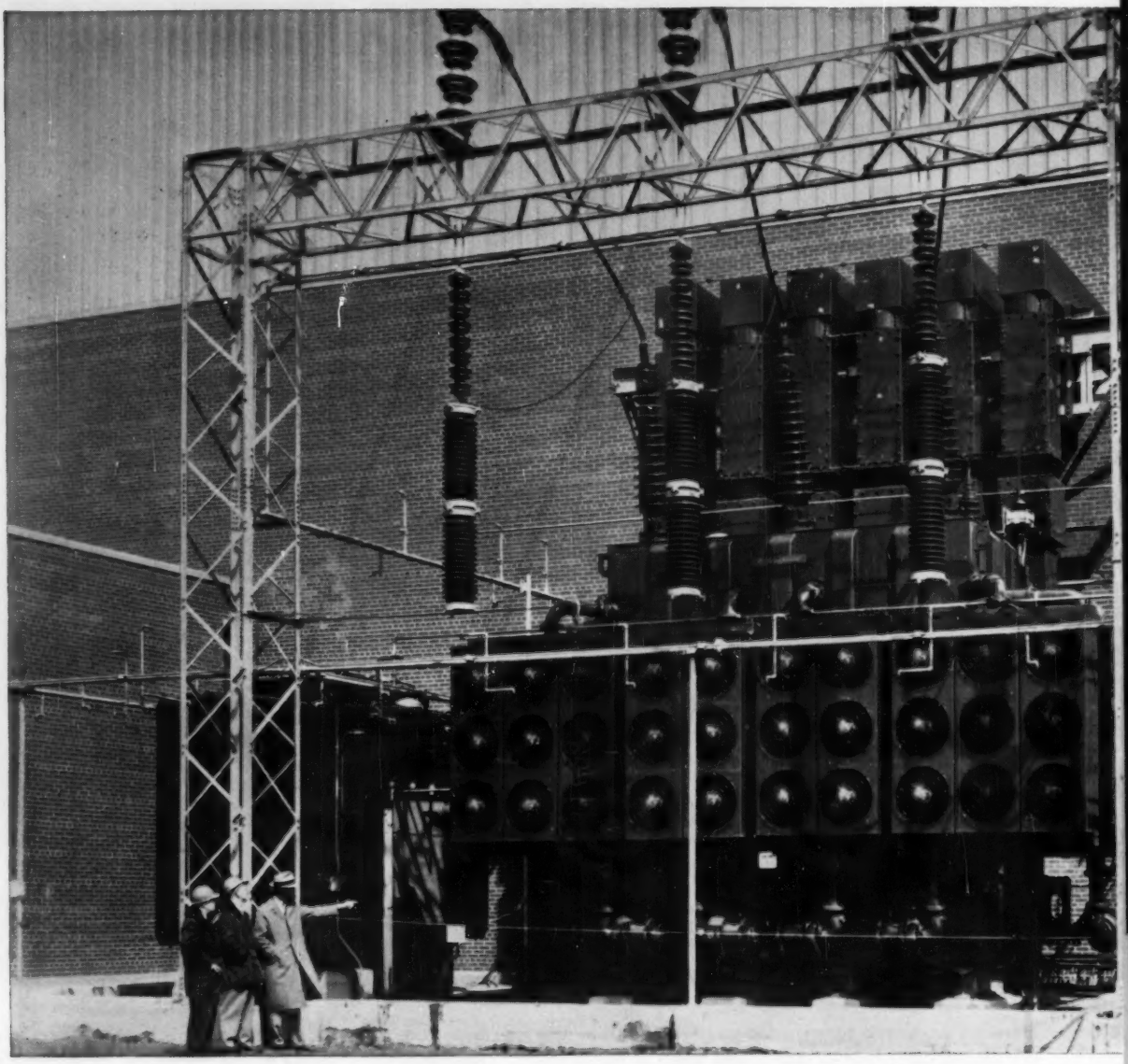
Fourth, to ease operating chores, the Westinghouse recloser design provides two separate tanks . . . one, an oil tank, housing the interrupters; the other, a relay and mechanism tank. No scrambling in oil tank with recloser control devices . . . a tank lifter offers easy oil and contact inspection. An accessory cabinet is available with ammeters, control protection and switches . . . demand meters separately trough mounted provide means of load indication and integration.

There's more to the story, so call your Westinghouse representative, or write to Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna.

J-60890

WATCH WESTINGHOUSE!

*WHERE **BIG** THINGS ARE HAPPENING **TODAY!***

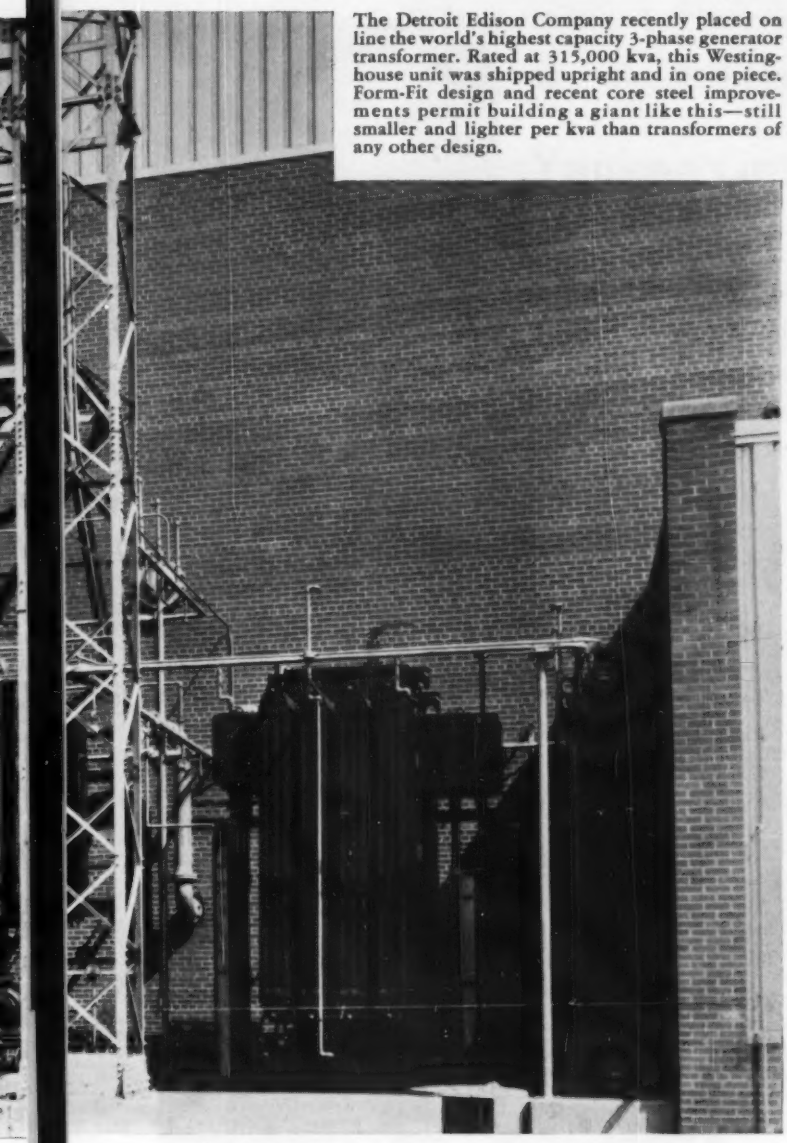


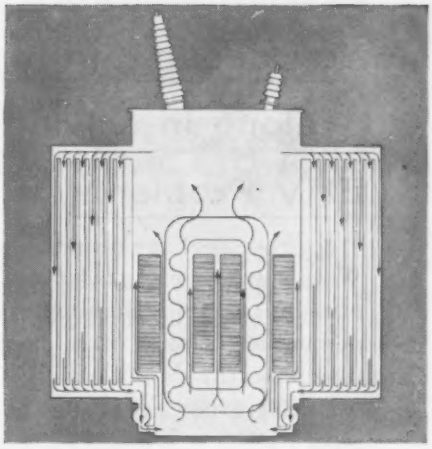
FORM-FIT® TRANSFORMERS

...A basic design with room to grow

World's highest capacity generator transformer again proves economy of exclusive Westinghouse design

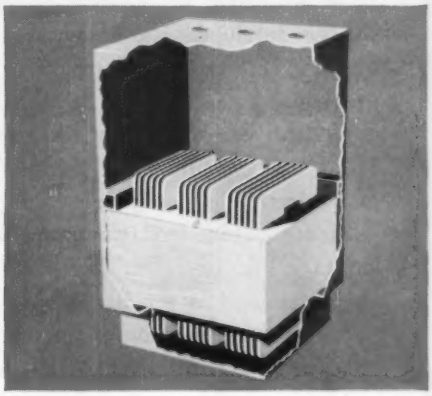
The Detroit Edison Company recently placed on line the world's highest capacity 3-phase generator transformer. Rated at 315,000 kva, this Westinghouse unit was shipped upright and in one piece. Form-Fit design and recent core steel improvements permit building a giant like this—still smaller and lighter per kva than transformers of any other design.





Close-fitting tank and vertical coil construction together form directed paths for coolant. Forced oil cooling eliminates the need for thermal head. Maximum coverage of coil surfaces and efficient use of oil give you a compact, economical unit.

With shell-form construction, the core surrounds, supports and protects a series of upright coils. This arrangement provides excellent mechanical strength . . . capable of withstanding the stresses imposed by shipping, installation and service.



Here is one basic idea in high-voltage transformers that has consistently given you more equipment per dollar invested. It's Form-Fit design. A Westinghouse exclusive, Form-Fit design has proved superlatively efficient, yet practical in both size and weight . . . at any rating.

Here is what Form-Fit construction does, for instance, to improve heat transfer while reducing bulk of the transformer. All coils are vertical, and in pancake-fashion are interleaved with insulation. This structure forms long, straight ducts allowing free flow of oil from bottom to top, and on both sides of each coil. With forced cooling, a high volume of oil circulates over a maximum surface, following these naturally efficient paths without the use of special baffles. Result? More efficient heat transfer and lower temperature differences.

And surge strength? Form-Fit design provides it, with the large-area coil giving high coil-to-coil and low coil-to-ground capacity. Distribution of impulse voltage is excellent. Dielectrically, the Westinghouse Form-Fit principle can be extended to any voltage level.

So here's a design with room to grow . . . for capacity not yet specified, for transformers not yet built. To make absolutely sure you get all the quality and performance you'd expect from Westinghouse, all power transformers rated above 10,000 kva and 69 kv are impulse tested right on the production line.

Get in touch with your Westinghouse sales engineer, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-70768

WATCH WESTINGHOUSE WHERE **BIG** THINGS ARE HAPPENING FOR **YOU!**

You needn't go it alone in solving EHV Problems

Where do you go for guidance when planning an extra-high voltage transmission line or some other pioneer-type project?

Usually, experience of other builders of EHV lines is limited, and may not apply to your problems.

At this point O-B often can be helpful. Answers not available in practice can be found or have been found in the laboratory. In the O-B laboratory, high voltage research has been going on for half a century. From test results we've built an important fund of knowledge, and we've developed the ability to interpret those results in terms useful to you.

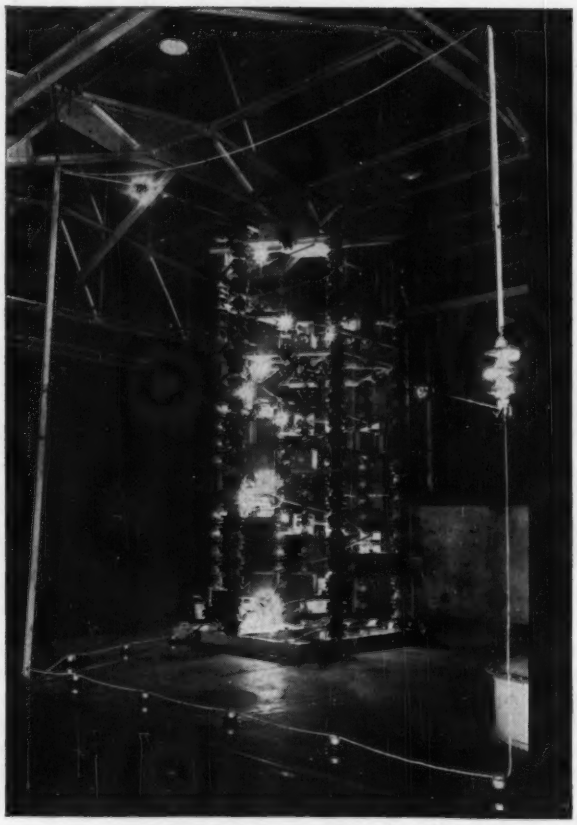
Then there is a management attitude that encourages exploration of new electrical frontiers. For example, decades before today's extra-high voltage lines were built, EHV was being studied in the Barberton laboratory. Today O-B insulators and hardware are in service on every EHV line in North America.

That's why coming to O-B often gives you a head start in solving your problems. Maybe we already have the answers. If we don't, we're always ready to help in working out problems of mutual interest. There's no need to go it alone in solving EHV or other special problems.

4671-H

Ohio Brass

MANSFIELD OHIO, U.S.A.



"THEY SAID IT COULDN'T HAPPEN" — Even with a shunt connected in parallel, insulators flashover in Barberton laboratory when simulated direct lightning stroke is applied. With information gathered in such tests, a new and more comprehensive understanding of tower flashover can be developed.

WILLIAM WEBSTER

After Grappling with Many Problems . . .

Yankee Gets Atomic Go-Ahead

AEC OK's $34.5 million project, underwriting $5 million for research and development. Yankee Atomic to shoulder full plant cost

Yankee Atomic Electric Co has the green light to proceed with construction of a nuclear power plant for New England. The Atomic Energy Commission has signed a contract with the company to undertake the $34.5 million, 134,000-kw project in Rowe, Mass. This is the first contract concluded under AEC's power demonstration reactor program, aimed at bringing private industry resources into the development of nuclear power.

Yankee Atomic will bear the entire cost of the plant. AEC will underwrite the $5 million research and development cost. Any research and development expenses over $5-million will be paid by the company. However the Commission will waive its normal charge for the use of special nuclear material to fuel the reactor beginning June 6, 1956, and ending five years after the Commission issues the operating license.

Yankee Atomic represents New England Power Co, Connecticut Light & Power Co, Boston Edison Co, Central Maine Power Co, Hartford Electric Light Co, Connecticut Power Co, Western Massachusetts Electric Co, Public Service Co of New Hampshire, Montaup Electric Co, New Bedford Gas & Edison Light Co, Cambridge Electric Light Co and Central Vermont Public Service Co.

To Have a Steel Clad Core

The contract provides for Yankee to build and operate a pressurized light-water-cooled-and-moderated reactor. The fuel element will be made of uranium oxide clad in stainless steel. The core element represents one of the major design changes from previous pressurized water reactors which generally use cores clad with zirconium or aluminum.

A unique aspect of the Yankee atomic project is this: It is the only project to be integrated into systems of all the shareholder companies. Major construction is expected to start next spring, with the plant going on the line in 1960.

When addressing the Joint Atomic Energy Committee in May, William Webster, president of Yankee Atomic, said his group was looking for a reactor type that could be installed promptly, that promised reasonable reliability of operation, and—even if not competitive at the outset—that would be sufficiently flexible to take advantage of anticipated improvements with the goal of truly competitive nuclear power "not hopelessly out of reach."

Core Holds Competitive Promise

The PWR was chosen, he added, as most nearly satisfying these requirements. "The plant we propose to build will take advantage of the very considerable body of reactor technology in this field", he says, "but will use a new type of core which promises improved economic performance and may hopefully bring us within striking distance of competitive power . . . Whatever the ultimate future of the PWR may be, it seems destined to provide a substantial portion of the first increment of atomic power, and our experience with this plant may well point to refinements that will be incorporated in succeeding reactors of this type."

Westinghouse Electric Corp will handle the development and design of the project, and Stone & Webster Engineering Corp, the construction.

To Check Area Radiation

Yankee has awarded a contract to Taller & Cooper, Inc., Brooklyn, N. Y., to manufacture weather observation equipment to be used in meteorological studies in the Deerfield Valley. The company is also working on an improved method for measuring and analyzing existing radiation levels in the area. This development work on equipment is being done under contract by Allied Research Associates, Boston.

Yankee Atomic will finance the project on a conventional utility basis and preliminary approvals have been obtained from the Securities & Exchange Commission and the Massachusetts Department of Public Utilities.

The contract provides that Yankee Atomic will report fully to the AEC on technical and economic information obtained from the project. The company also will be required to process spent fuel elements from the project in accordance with the policies and prices of the commission which are in effect at the time processing is required.

AEC has contract negotiations underway on two other nuclear power projects from the first group of proposals: Power Reactor Development Co, Inc, which includes Detroit Edison Co, and Consumers Public Power District of Nebraska.

In addition, AEC is negotiating contracts on smaller reactor projects from the second round demonstration program.

Chudoff Committee Report Appears

Accuses Administration of fostering private monopoly by destroying the federal power program. Asks for probe into utilities' political status

The House Government Operations Committee, in a stinging blast against privately owned electric power companies, has released its 254-page Democratic majority report which accuses the Eisenhower Administration of trying to "foster private monopoly" in the power field.

It called for the resignations of Interior Undersecretary Clarence A. Davis and Assistant Secretary Fred G. Aandahl.

The report covered hearings held last summer by a group headed by Rep Earl Chudoff (D-Pa.) into Administration power policies.

Even newspapers normally sympathetic to Democratic power policies, notably the Washington Post and Times Herald and the Denver Post, wrote protesting editorials.

Even some Democrats took exception to the strong condemnation of the private utility companies. Rep Dante B. Fascell (Fla.) and L. H. Fountain (N. C.) both filed additional views with the committee.

Said Fountain: "I seriously doubt the wisdom and fairness . . . of blanket criticism of all private power companies, without any power company having had an opportunity to be heard." Power companies were not being investigated and the majority report should not have contained the conclusions it did concerning them.

Fascell expressed similar views. Rep Porter Hardy (Va.) and other Democrats have endorsed the Fascell-Fountain position.

These were the key charges in the majority report:

1. Former Interior Secretary Douglas McKay, Davis, and Aandahl, "applied every possible pressure" on co-ops to accept Georgia Power Co's plan for marketing Clark Hill power.

2. "In the Southwest, the present administration of the Department of the Interior has resorted to every conceivable device to end the partnership arrangement between the Southwestern Power Administration and the rural electric co-ops and to force the co-ops and other preference customers into dependence on neighboring private power companies. . . ."

Chudoff: Committee Head

3. "In the Intermountain states, Rural Electrification Administrator Ancher Nelsen and his aides have used continuous pressure to coerce the Colorado-Ute generation and transmission co-op . . . to integrate on unfavorable terms with the Western Colorado Power Co, despite a confidential REA staff study which showed it would be cheaper for the cooperatives to go it alone."

4. "In the Central Valley of California, the influence of the dominant Pacific Gas & Electric Co was sufficient to disrupt the effective carrying out of the preference provision, although not before it had demonstrated the effectiveness of public competition in reducing the cost of power supply to small municipal electric systems."

5. "In the Pacific Northwest, the Administration is striking at the very heart of the federal Columbia River Basin multipurpose program by refusing to ask for planned and scheduled new project starts, thus forcing the region into a prospective power shortage which is being used to drive preferred customers into ultimate dependence on non-federal sources of power supply."

6. "The Department is deliberately shrinking the Bonneville Power Administration market region to exclude Idaho and other areas" by killing previous Administrations' request for funds for interconnections.

7. "The announced Administration policy is . . . designed to destroy the federal power program. . . ."

The majority report then made these recommendations:

1. That the President call for the resignation of the officials, as mentioned above.

2. Congress resume appropriations for federal power projects.

3. Congress give recognition to "federal responsibility for regional interconnection of federal power projects and for the transmission, as well as firming up, of the power . . ."

4. Congress provide funds for transmission facilities for Clark Hill power.

5. Congress launch an investigation to determine whether or not there is an "organized effort of private power companies to influence the federal Administration, the Congress, the governments of the states, and the political life of the nation."

Aandahl: Under Attack

But Minority Attacks It Bitterly

Republican members decry the committee's "shocking misuse of Congressional prerogatives" to promote federal power expansion in the future

Republican minority members, headed by Rep Clare E. Hoffman (R-Mich.) hit back in an angry 50-page rebuttal. They accused the majority of making "unsupported accusations" and of having shown a "shocking misuse of Congressional prerogatives and functions for partisan purposes."

The Republican members of the committee made these replies to the majority report:

1. "Unsupported accusations" were pronounced against government officials "in their absence and without giving them a chance to answer their accusers until months later."

2. Despite the chairman's "professed belief" that the subcommittee "would listen to anybody that wants to be heard," there were "repeated refusals to hear testimony in justification of the policies under attack."

3. Chairman Chudoff repeatedly said the hearings were being held because of numerous complaints by preference customers. "No copies of these complaints or any evidence that complaints were actually made was presented during the hearings," the minority said, "and a subsequent examination of the files of the subcommittee failed to disclose them."

Davis: Sniped At, Too

Hoffman: Ike's Champion

4. "The status of the Colorado River Commission of Nevada as a preference customer is completely disregarded when it suits the convenience of the majority in order to attempt to prove that Secretary Aandahl was trying to siphon the power in question to the Pacific Gas & Electric Co."

5. "The record shows that witnesses were solicited by staff members to testify; were interviewed and briefed in advance of their testimony by staff members; and that only witnesses adverse to the Administration were selected to testify in the field."

6. "The whole tenor and contention of the majority report is that the federal government has gone into the electric utility business and hence has assumed an obligation to expand and extend its operations. . . ."

7. If the "majority's position were accepted, it would sound the death knell of local public or private enterprise in the electric utility field . . . if the federal government has any such responsibility (to supply "tax-free federal power") in Georgia or Oregon, then to give all Americans equal treatment, it must be extended to the 46 other states."

8. While repeatedly saying that private companies were not being investigated, the "majority report contains a reprehensible suggestion that the private power companies across the country have combined in a gigantic conspiracy against our nation." But "not one utility witness was permitted 'his day in court' during proceedings."

9. "Throughout the majority report there are frequent allusions to 'private monopoly,' 'monopolistic' private companies, and other phrases related to the concept of monopoly as it applies to the electric utility industry. In each case the majority uses these words in a derogatory context implying broad charges that electric utilities are unlawful monopolies . . . these are perhaps the most flagrant half-truths which mark the majority report."

10. "The case which the majority has laboriously attempted to build against secretaries McKay, Davis, and Aandahl in connection with Clark Hill project on the Savannah River dissolves into thin air in view of the contracts signed since the hearings closed." The fact "that a previous Administration was unsuccessful in negotiating suitable contracts was conveniently overlooked."

11. Testimony in the hearings "proved that the problems of the Southwestern Power Administration were inherited from the previous Secretary of Interior . . . it was not until the SWPA officials were belatedly heard in Washington that the facts came out."

12. With regard to majority charges concerning Colorado-Ute, "the testimony of Mr Nelsen and his associate Mr Schultz not only demolishes the charge that REA forced Colorado-Ute into an unwanted partnership arrangement but also furnishes answers to many of the thitherto unanswered questions directed at the cooperative witnesses by members of the subcommittee. . . . The sum and substance of the evidence indicates entirely voluntary negotiation by Colorado-Ute of a lease-operating agreement with Western Colorado Power Co."

Pacific Power Drills at Swift Hydro Site

Pacific Power & Light Co, preparatory to actual construction of its 256,500-kw Swift hydro project in the Lewis River Canyon, above, has begun drilling operations at the site, below.

Above picture was taken looking upstream from approximate location of axis of 510-ft fill dam included in $58.7-million project. Below, an aerial cable carries construction workers to a drilling platform in the middle of the turbulent river. Core drill on the platform is exploring underlying foundation at the site which will be Pacific Power's third on the river.

PE's Eddystone to Get Second 325,000-Kw Unit

Lower steam conditions will be used in a new supercritical steam pressure generator to be installed by Philadelphia Electric Co as the second unit of its $110-million Eddystone station now under construction on the Delaware River near Chester, Pa.

The turbine generator will match the 325,000-kw capacity of the first, but will have an initial temperature of 1,050 F, and will operate at 3,500 psi, in comparison to Unit 1's throttle conditions of 1,150 F (ultimately 1,200 F), operating at 5,000 psi. Both turbines are of the cross-compound type, with two stages of reheat, both at 1,050 F.

The new unit, to be built by General Electric Co, is expected to be in operation early in 1960. The first generator (EW, Nov. 15, 1954, p 114) is scheduled for use in 1959. Upon completion, the two units are expected to produce enough power to supply the electrical needs of one million homes.

2-Yr Extension Granted for Priest Rapids Dam

Some of the pressure was taken off the Grant County PUD of Ephrata, Wash., in its proposed construction of Priest Rapids Dam on the Columbia River when it received a two-year extension in which to start work on the $163 million project.

The Federal Power Commission originally specified that work must be started by July 1, 1956. This date now has been extended to July 1, 1958, but the PUD hopes to start construction late next month.

Negotiations now are under way for sale of the bonds by an underwriting syndicate headed by John Nuveen & Co of Chicago. Following sale of bonds, a $91,878,625 contract for construction of the dam will be awarded to Merritt, Chapman & Scott of New York.

Dix Dam Gets $9 Million

A $20,839,000 1956 construction budget announced by Kentucky Utilities Co includes $9 million for work on the 500,000-kw E. W. Brown Plant's first unit at Dix Dam.

HERE'S ANOTHER WAY...

Preformed Guy-Grips CUT GUYING COSTS!

EXAMPLE:

Consider a 40-foot guy—with breaker—using ⅜" Siemens-Martin strand—rated at 6950 lbs.

by using

PLP GUY-GRIPS

Strand is terminated here
(no looping required)

1 Since PLP Guy-Grips eliminate looping, strand saving of 12 feet or more per guy results. **SAVING: $.67 per guy**

2 Substitute ¼" Extra High Strength Strand—rated 6650 lbs. PLP Guy-Grips make this possible since they hold the full rated strength of E.H.S. Strand. The following strand savings result (current cost of ⅜" galvanized strand is $2.24 per guy while ¼" E.H.S. costs $1.36 per guy)*: **SAVING: $.88 per guy**

TOTAL STRAND SAVING ALONE: $1.55 per guy

3 Preformed Guy-Grips cost only $.55 each for ¼" E.H.S. Strand size. (PLP Cat. No. 25 GDE-¼")

Compare this cost with your current fitting.

PLUS LABOR SAVINGS

In every Preformed Guy-Grip installation, you hold the full strength of the strand.

☑ CHECK THESE ADDITIONAL SAVINGS:

✓ With PLP Guy-Grips, leading utilities estimate installation savings upward of 50%.

✓ Save an additional 10% by using 3-wire strand instead of 7-wire. PLP Guy-Grips will hold 3-wire strand equally well.

✓ Save space and inventory costs by standardizing on PLP Guy-Grips and lighter E.H.S. Strands. One size strand can be substituted for several sizes and grades previously used.

PLP GUY-GRIPS ARE ALSO AVAILABLE IN COPPER-WELD, BRONZE, AND STAINLESS STEEL.

**Based on current strand prices—75,000 feet to carload lots.*

Let us give you more information on their exclusive advantages. Write or call Preformed Line Products Company's Cost Express 1-2571.

PLP GUY-GRIPS DON'T SLIP . . . even under impact!

Made in accordance with or for use under one or more of the following U.S. Patents: 2,275,039; 2,307,521; 2,409,553; 2,691,063; other patents pending.

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Save Thousands of Dollars in

Allis-Chalmers Solves Problem of Bushing Interchangeability

...115 kv and above

Now Standardized High Voltage Bushings for Allis-Chalmers Transformers and Circuit Breakers

FOR any voltage class, one spare bushing is probably all you'll need for both Allis-Chalmers transformers and circuit breakers.

Think of what this will mean in savings in reduction of large idle bushing inventories.

Check the chart below for dimensional and rating information.

This is another example of Allis-Chalmers progress in Switchgear and Transformers.

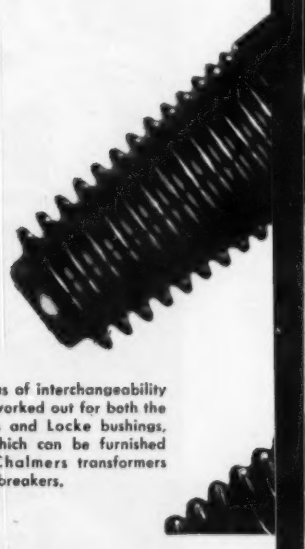
For details on how you can take advantage of this development, call your nearby A-C office, or write Allis-Chalmers, Milwaukee 1, Wisconsin.

FLANGE DETAIL

	Voltage Class, Kv	BIL	Current Amperes	LOWER END			FLANGE					TOP END TERMINAL	
							GASKET SPACE		PROVISION FOR BOLTS				
				Length of Bushing from Flange Seat to Lower End	Depth of Curr. Transf. Pocket, Distance from Bushing Gasket Surface to Min. Oil Level	Max. Diam. from 1" Below Flange to Lower End of Bushing	Inside Diameter Maximum	Outside Diameter Minimum	Number	Bolt Hole Size	Bolt Circle Diameter	Length	2-1/2" Useable Threads Class UNF-2A
				L	W	D	P	Q				A	R
	1	2	3	4	5	6	7	8	9	10	11	12	13
*	115	550	1600	42-15/16	23	9-1/2	9-7/8	11-7/8	6	1-1/4	13-1/4	3	2"-12
*	115	550	1200	42-15/16	23	8-3/4	9-7/8	11-7/8	6	1-1/4	13-1/4	3	2"-12
	115	550	800	46-11/16	26-3/4	8-3/4	9-7/8	11-7/8	6	1-1/4	13-1/4	3	2"-12
*	138	650	1600	46-11/16	23	10-1/2	10-7/8	12-7/8	6	1-1/4	14-1/4	3	2"-12
*	138	650	1200	46-11/16	23	9-3/4	10-7/8	12-7/8	6	1-1/4	14-1/4	3	2"-12
	138	650	800	50- 7/16	26-3/4	9-3/4	10-7/8	12-7/8	6	1-1/4	14-1/4	3	2"-12
*	161	750	1600	50- 3/16	23	11-1/2	12-3/8	14-3/8	8	1-1/4	15-3/4	3	2"-12
	161	750	800	53-15/16	26-3/4	11-1/2	12-3/8	14-3/8	8	1-1/4	15-3/4	3	2"-12
*	196	900	1600	59- 9/16	26-3/4	14-5/8	17-1/8	19-1/2	12	1-1/4	21	3	2"-12
	196	900	800	59- 9/16	26-3/4	14-5/8	17-1/8	19-1/2	12	1-1/4	21	3	2"-12

* Interchangeable between transformers and circuit breakers, suitable for draw leads at reduced current ratings.

NOTE: Oil gauge and capacitance tap are in line halfway between flange bolts.



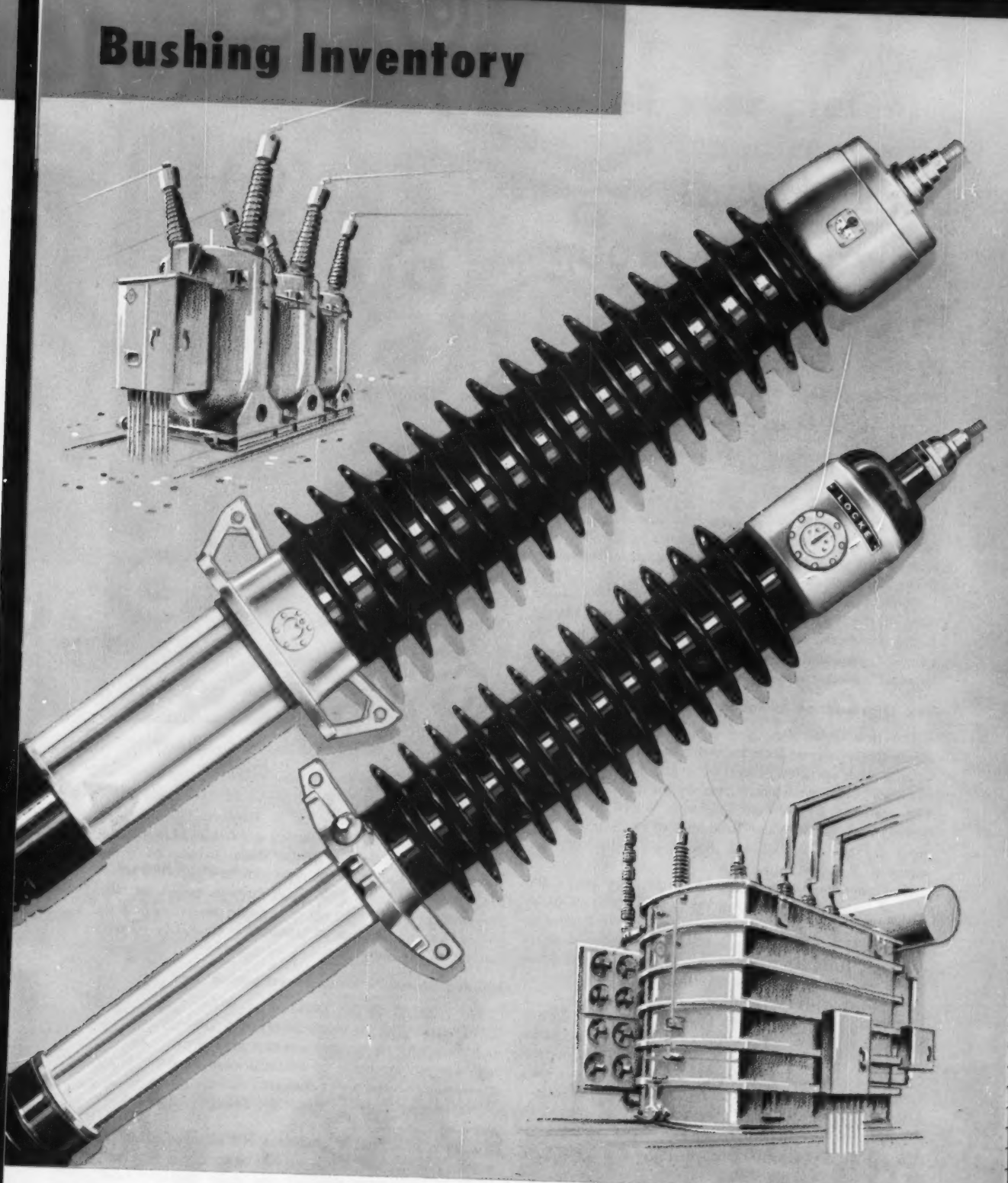
The problems of interchangeability have been worked out for both the Ohio Brass and Locke bushings, either of which can be furnished with Allis-Chalmers transformers and circuit breakers.

A-C ALLIS-CHALMERS

ALLIS-

A-5092

Bushing Inventory



CHALMERS

LIVE BETTER ELECTRICALLY

Banks Heads New Hydro Group in California

New Department of Water Resources will be led by H. O. Banks, former state engineer; unit replaces others with overlapping duties

California's new Department of Water Resources—vested with top authority over programs for development of the state's water resources—will be headed by Harvey O. Banks, former state engineer.

At the same time that Gov Goodwin J. Knight named Banks to the $18,000 a year post he announced that Marcel J. Shelton, general manager and chief engineer of La Mesa, Lemon Grove, and Spring Valley Irrigation District, will be deputy director at $17,000 a year.

New Organization to Squelch Chaos

The new department was organized by the recently-adjourned legislature to bring order to the chaos of overlapping water agencies. Several water groups were abolished and their duties were taken over by the new department. The abolished groups were California Water Project Authority, Division of Water Resources in the State Department of Public Works, and Banks' old office of state engineer.

Other agencies were relegated to advisory status and were placed under Banks. Among these is the State Water Resources Board, which was responsible for the California Water Plan—statewide program for development of water resources. If the Water Resources Board and the director of the new department disagree, the director shall prevail, the enabling act for the reorganization states.

One sign of the importance attached to the new department is that the director has "cabinet status"—he is a member of the Governor's Council. Thus water problems will be in the hands of a highly centralized agency, with a "straight line of command" starting with the governor.

Both the director and his deputy can be removed by the governor.

Selection of engineers for both posts is a victory for those who contended that qualifications for engineering aspects of the job should be given more weight than for legal and financial aspects.

Banks graduated magna cum laude from Syracuse University in 1930 with a B. S. degree in civil engineering. He has done graduate work at Stanford University in hydraulic and sanitary engineering and has an M. S. degree.

His first experience with the State Division of Water Resources was in 1938, in the southern California office. He served there until 1946 (with three years out for military service) and he then entered private consulting practice as a partner in the firm of Harold Conkling, Los Angeles consulting engineer.

Headed Water Pollution Investigation

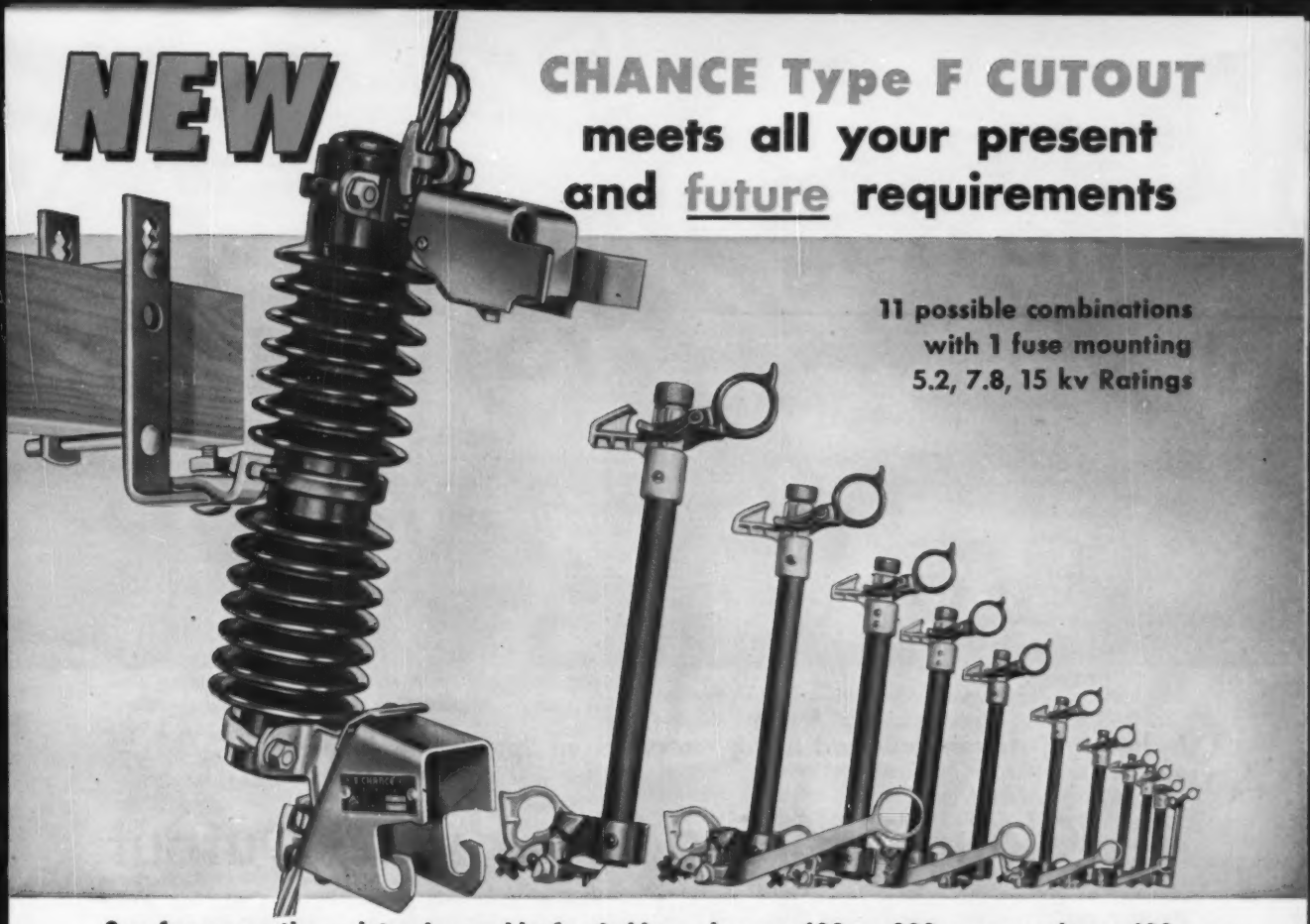
He returned to the Division of Water Resources in 1950 to supervise the water quality and pollution investigation program. He became assistant state engineer in 1953 and was put in charge of administration of water rights. He directed several water resources studies.

He became state engineer last January. Banks is 46 years old.

Shelton is a Purdue graduate. His experience includes private practice and a stint as city engineer for El Centro. He became general manager and chief engineer of La Mesa, Lemon Grove, and Spring Valley Irrigation District, a water utility in the San Diego area, in 1948.

NEW

CHANCE Type F CUTOUT
meets all your present and future requirements



One fuse mounting—interchangeable fuseholders give you 100 or 200 amp regular or 100 amp load break cutouts—interrupting capacities 2000 to 12000 amps, plus a disconnect

Here's a way to simplify your cutout stocking problems—lower storage, handling and installation costs. With the Chance Type "F" line of cutouts, you stock only one type of fuse mounting and a choice of fuseholders for complete system protection. You can choose from *eleven* different combinations, including a disconnect, to fit your exact needs. And when you want to up-rate an installed cutout or convert it to load break, a simple change of fuseholders does the job—*in the same fuse mounting!*

The Type "F" Cutout combines 16 important features asked for by distribution engineers in a nationwide field check . . . and *only* the Chance Type "F" offers *all* these features! Check the table below. Ask your Chance Distributor to show you this new Cutout line, or write us.

A. B. CHANCE CO. • CENTRALIA, MISSOURI • San Francisco, California • Pittsburgh, Pennsylvania

	Chance Type "F"	Cutout "G"	Cutout "H"	Cutout "I"	Cutout "J"	Cutout "K"	Cutout "L"	Cutout "M"
Interchangeable Fuseholders Covering Complete NEMA Range	YES	NO	YES	NO	NO	YES	NO	NO
Wrap Around Insulator Bolts	YES	YES	NO	YES	YES	NO	NO	NO
Bird Proof Construction	YES	YES	YES	YES	NO	YES	NO	YES
Lift and Tie Ring	YES	NO	NO	NO	NO	NO	YES	YES
Universal Terminals	YES	YES	NO	YES	YES	YES	NO	NO
Sleet Hoods at Both Ends	YES	YES	NO	YES	NO	NO	NO	NO
Positive Guiding of Tube	YES	YES	YES	YES	NO	YES	YES	YES
Positive Latch	YES	NO	NO	NO	NO	NO	YES	NO
All Contact Surfaces Silver Plated	YES	YES	YES	YES	NO	NO	YES	YES
Self Cleaning Contacts	YES	YES	YES	YES	YES	NO	YES	YES
Lever Action When Opening	YES	NO	NO	NO	NO	NO	NO	NO
Link Ejector	YES	NO	NO	NO	NO	NO	YES	YES
Load Break	YES	YES	YES	YES	YES	YES	YES	NO
Fuseholder Cannot be Installed Backwards	YES	YES	NO	YES	YES	YES	YES	YES
180° Stop to Prevent Fuseholder Swinging Back into Pole	YES	NO	NO	YES	YES	NO	NO	YES
NEMA Standard Mounting Bracket	YES	YES	YES	YES	YES	YES	YES	YES

56-6

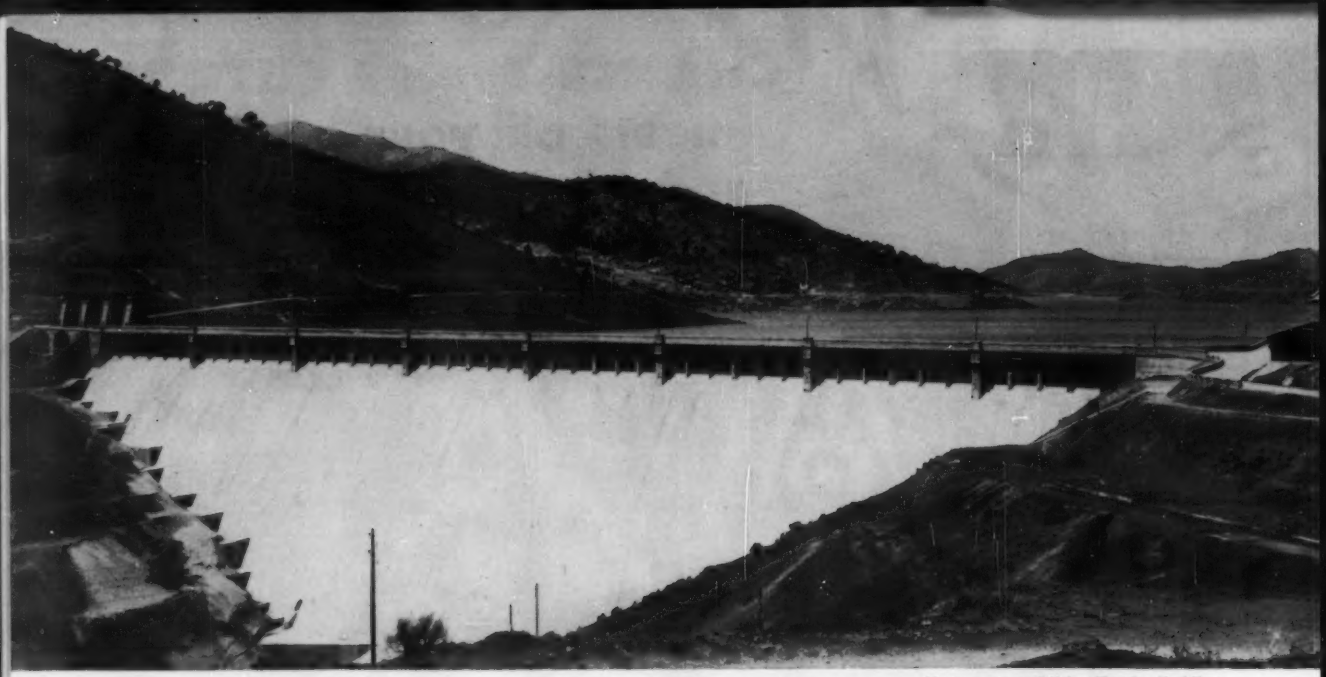


Photo courtesy of Union Electrica Madrilena

By boosting stream flow and filling reservoirs on Spain's Rio Alberche . . .

Cloud Seeding Ups Hydro Output

IRVING P. KRICK, President, Water Resources Development Corp, Denver, Colo.

Two years of cloud-seeding operations in Spain—designed to increase stream flow for power production—point toward conclusive results. Each year stream flow was compared to expected runoff from the Rio Alberche, the center of the rain-stimulation efforts. The results—an increase of 64% the first year and 127% the second.

The Alberche watershed has been a target for cloud seeding longer than any other area in Spain. On this basis and in terms of results, the Alberche operations offer a significant opportunity to assess the value of weather modification to a utility with hydroelectric generation.

The Rio Alberche watershed encompasses 800 square miles of mountainous country north of Madrid. A series of hydroelectric plants, with 82,920 kw installed, lines the river's course. They are operated by Union Electrica Madrilena, which serves a portion of Madrid. The utility also operates 14,600 kw of steam generation capacity.

Cloud seeding for the Alberche watershed is controlled from a continuously manned weather-reporting center at Barajas Airport in Madrid. Telephone contact links the control center to 59 field stations to the west and south along lanes of prevailing moisture-laden southwest winds. When a storm is forecast and actually develops, Spanish field personnel at the 59 stations whip silver-iodide smoke generators into action.

Silver iodide can be vaporized to produce millions of tiny ice nuclei which in turn form ice crystals in saturated air at temperatures as high as 25F. For large-scale operations, silver iodide has this advantage over dry ice: Silver iodide can be dispersed continuously into an air stream in effective nucleating concentrations and over relatively wide areas. It can be introduced into cloud masses from the earth's surface because of the natural rising motions and turbulent diffusion present in all storm situations suitable for cloud seeding.

To control the large-scale Alberche operations, a diffusion pattern was computed. It showed how the diffusion of silver iodide particles from ground generators was related to the seeding operations. The pattern was found to be a function of atmospheric parameters influencing the movement of silver iodide crystals.

Calculations of the diffusion pattern required the tracking of major storm systems and the hourly monitoring of surface and upper air observations. These data were supplied by the Spanish National Weather Service and supplemented by reports from the 59 field stations.

In the actual seeding operations, it was found convenient to vary, depending on the particular weather situation, the size and number of silver iodide crystals dispersed through an air stream. This was done by burning sized foundry coke impregnated with a solution of silver iodide in acetone. The fuel was fed to a 2,500F furnace at a rate which vaporized about one ounce of silver iodide per hour. This method furnished proper crystal counts for operations under most weather conditions.

Results showed that, other things being equal, the higher the freezing level, the more distant the generator should be placed from the target area. Another consideration was the potential of the particular meteorological situation to

produce natural rainfall. Cloud seeding was most productive during periods of continuous and widespread natural rainfall.

These factors determined the number and location of generators for the target area. Occasionally, however, the cloud-seeding efforts were concentrated more precisely during a particular storm by supplementing the fixed installations with mobile units.

To determine the effectiveness of these operations, the annual precipitation at certain control stations was correlated to annual stream flow of the Rio Alberche. This study was made after completion of two years of cloud seeding—1952-53 and 1953-54. (The water year extends from Oct. 1 to Sept. 30.)

This precipitation-streamflow relationship, based on data for some 20 "unseeded" years, showed that expected streamflow for 1952-53 was 193.35-million cubic meters. Actual streamflow, augmented by cloud seeding, was 318.53-million cubic meters for the first year of seeding—64% more than the expected flow. Values for 1953-54 were 178.31-million cubic meters for expected runoff and 404.553-million cubic meters for the actual streamflow—a 127% increase.

Two factors enter into a determination of value of cloud seeding to a utility. One is the actual cost of weather modification operations—this is determined readily. The other factor is the amount of artificially produced precipitation that is above the normal rainfall.

Determination of this second factor involves an analysis that separates natural from induced precipitation. The analysis is complicated by the inherent variabilities of natural rainfall. Amounts differ greatly at a particular location from storm to storm and from place to place within the same storm. However, time tends to balance out these variations.

Therefore, several years of sustained cloud-seeding operations over one target area are required before conclusive evidence can be obtained. The seeding should take place continuously during the life of all storms and be targeted accurately to the operational area. This targeting

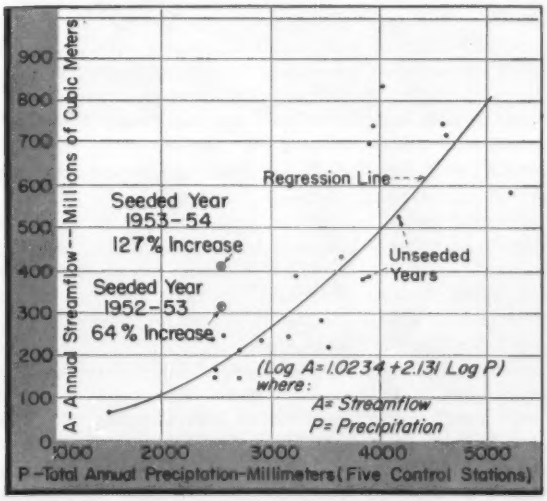


FIGURE 2—Evaluation of cloud seeding—based on relation of rainfall at control stations and streamflow in target area

FIGURE 1—Location of the five control stations that charted precipitation as part of cloud-seeding evaluation studies

permits the detection of differences between the rainfall in the target and in unaffected areas outside the target.

Prior to the Alberche operation, Union Electrica Madrilena completed studies relating rainfall in areas outside the drainage basin to streamflow within the basin. The utility selected five control stations in the path of prevailing storms sweeping over the Alberche watershed. However, the five stations were outside the target area and therefore not affected by cloud seeding. Figure 1 shows the location of the control stations with respect to the Alberche watershed.

Evaluating the Cloud-Seeding Operations

The Madrid utility's studies were used to evaluate the cloud-seeding operations. The evaluation involved a relationship between the sum of the annual rainfall at the five control stations and the runoff during each water year into the Burguillo Reservoir on Rio Alberche. The utility records yielded the runoff figures, while official reports of the Spanish National Weather Service supplied rainfall data. The information was incorporated into a chart: A point on the chart represented the relation of rainfall to streamflow for each "unseeded" year on the record books.

The line of best fit for these points was a curve in which streamflow increased exponentially with greater rainfall in the control areas. The resulting formula for the curve was used not only to estimate the amount of water attributable to cloud seeding but also as a basis for payment.

Runoff resulting from the cloud seeding was stored behind the dam for hydrogeneration. The value of the water impounded there could be computed as a function of the energy which it would produce.

Figure 2 presents an assessment of the Alberche operation to date, based on the precipitation-streamflow relationship used in the evaluation. The points representing the two seeded years are at distances greater than two standard errors from the original curve—a statistically significant achievement. The distance also indicates, within the limits of calculation errors, the increment of water attributable to cloud seeding.

If the cloud-seeding operations continue for a number

(*Continued on page* 38)

Employees meet at recreation center . . .

where indoctrination program shows . . .

How Toledo Edison Gets Results

EDWARD J. DOWD, JR, Former Supervisor, Training and Education, Toledo Edison Co, Toledo, Ohio

Toledo Edison Co put an employee indoctrination program into action about 18 months ago. Just one year later, the utility had these results:

• Question—"What is your impression of our indoctrination program?"

Answers—"Very good," 80%; "Good," 18%; "Fair," 2%; "Poor," 0%.

• Question—"Did you feel that the indoctrination program was beneficial to you in adjusting to your work and the company?"

Answers—"Yes," 90%; "No," 10%.

These questions were part of an unsigned questionnaire solicited from participants in the first year of the company's program.

Results indicate that the indoctrination is attaining its main objective: To acquaint new employees with the company, its scope, policies, organization, and opportunities.

Other objectives of the program are to lay a foundation for communication between employer and employee and to eliminate frustration and fear.

Toledo Edison's program achieves its objectives and yet is a pleasurable, instructive, and informative experience. The training is carried out in an informal, coeducational manner among small groups. This encourages employee participation and helps the employment supervisor avoid lecturing to the group.

On his first Friday with the company a new employee receives his indoctrination. The employment supervisor takes the small indoctrination group to the Edison Club, the employee recreational center located on the Maumee River about 10 miles from Toledo.

There the company history, employee benefits, programs, and policies are discussed in informal round table style. Conversation is encouraged, opinions are solicited, and efforts are concentrated on creating an atmosphere of friendliness.

After the round table forum, luncheon is served at the Edison Club. Then the group is taken on a tour of the company's power stations, service buildings, and office building in the Toledo area. At each building the older employees demonstrate their duties to the newcomers.

In fact, the personnel department often receives calls from older employees who also want to go on the "tour," as they call it. Consequently, one or two older employees are included each week.

The older employees, with various lengths of service, respond enthusiastically to the program. Many of them realize that, in doing their daily work, they lose sight of the "over-all picture" of the company. The orientation program helps them put that picture back in focus.

Toledo Edison has tailored the indoctrination to its needs, size, and incidence of employment. These are the purposes of the program:

1. To create a favorable attitude toward the company.

2. To create a feeling of belonging to the organization.

3. To make the employee feel he is important to the company.

4. To instill in the employee the outlook and attitude that, in a service organization, each job is a "public relations position."

5. To reduce employee turnover.

6. To save time regarding employee questions on work, company rules, and policies.

7. To reduce grievances by carefully covering pertinent information on working conditions, method of promotion, and rules regarding work.

ANOTHER GIANT STRIDE FORWARD!

Sylvania announces a multi-million-dollar expansion in nuclear power development

A principal deterrent to realization of economical nuclear power has been the high cost of fuel and fuel reprocessing.

The objective of Sylvania's huge new expansion program will be to break this bottleneck and establish an assured supply of nuclear fuels and components. The first step in the five-year-long program will be the erection of new facilities for the production of fuel elements and related components. The site will be in the East, but the exact location has not yet been settled. The new facilities will be in addition to those already in existence which are available to meet your current needs.

Sylvania entered the atomic energy field ten years ago, and was a pioneer in the development of nuclear fuels. The new expansion program is a pioneering one, too—leading, it is hoped, to a large-scale competitive, privately financed nuclear energy industry that was envisioned in the Atomic Energy Act of 1954. The new production and engineering facilities will be owned entirely by Sylvania.

It is estimated that, by 1970, 5 per cent of the nation's generating capacity will be nuclear-powered; by 1980, the nuclear-powered capacity is expected to reach 20 per cent of the total. Sylvania's long-range aim is to provide a completely integrated "out-of-pile" fuel and reprocessing service for the power industry.

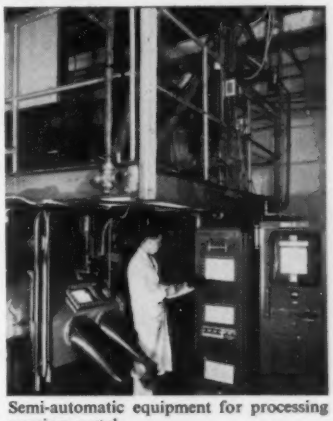
If your organization is considering reactor plans—for power or research—Sylvania's scientific and engineering staff will gladly discuss your problems with you. For your files, write for: *Sylvania Atomic Fuels and Reactor Components.*

SYLVANIA ELECTRIC PRODUCTS INC.
Atomic Energy Division, P. O. Box 59
Dept. F28V, Bayside, New York

In Canada, Sylvania Electric (Canada) Ltd.
University Tower Building, Montreal

Sylvania International Corporation
14 Bahnhofstrasse, Coire, Switzerland

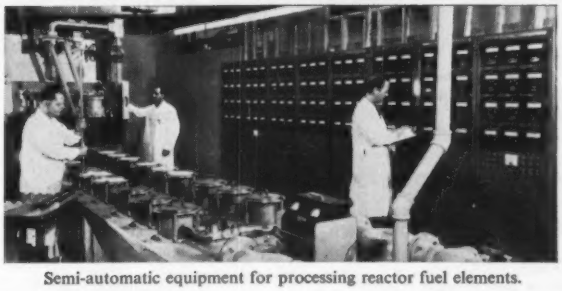
Rolling uranium strip for fabrication into fuel elements.



Semi-automatic equipment for processing uranium metal.

Experimental rolling mill and a few of many furnaces now in use.

Dry boxes used for handling readily oxidized materials, and highly enriched uranium.



Semi-automatic equipment for processing reactor fuel elements.

AN OPPORTUNITY TO SHARE IN THE FUTURE OF ATOMIC ENERGY

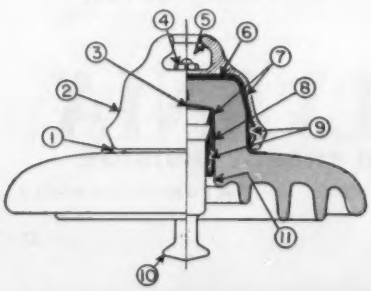
If you are a Metallurgist, Chemist, Chemical Engineer or Mechanical Engineer—Sylvania offers outstanding career opportunities in the field of Atomic Energy. You are invited to write Mr. Richard Clarke, Supervisor of Personnel, Sylvania Electric Products Inc., Atomic Energy Division, P. O. Box 59, Bayside, New York.

SYLVANIA®
ATOMIC ENERGY DIVISION

LIGHTING • RADIO • ELECTRONICS • TELEVISION • ATOMIC ENERGY

Triple-Tested...

Stainless steel pin, for use in high-contamination or coastal areas. Available in all suspension insulators on special order.



One of Illinois' outstanding porcelain products is this 10-inch suspension insulator. The cutaway view shows some of the features that assure quality.

1. Ample clearance between edge of cap and top of porcelain shield.

2. High-grade malleable cap, treated to prevent embrittlement when galvanized. Forged steel cap also available. Galvanizing is closely controlled in our own plant.

3. Treated fibrous washer provides a cushion between end of pin and porcelain.

4. Spring brass cotter key.

5. Smooth socket, accurately manufactured to standard dimensions.

6. Resilient compound provides cushion between bottom of cap and top of porcelain.

7. Resilient compound applied on inside of cap and outside of pin.

8. Sanded surfaces (controlled particle size).

9. Cemented joint between hardware and porcelain is neat portland cement.

10. Forged steel pin, accurately gauged to standard dimensions. Also available in stainless steel for use in high-contamination or coastal areas.

11. Radio glaze treatment available if desired, though these insulators meet satisfactory radio noise-level requirements without treatment.

Illinois Electric Porcelain... Triple-Tested To Insure Extra Mechanical And Electrical Strength

1 Complete laboratory control of materials.

2 Extensive new quality-control system.

3 Rigid final testing.

All combine to insure extremely high quality in the finished porcelain insulators.

by **W. V. SWAN,** Vice President
Illinois Electric Porcelain Company

In the two years that Illinois Electric Porcelain has been under Line Material Company operation, we have made extensive changes, from one end of the plant to the other.

A completely new ceramic laboratory has been built, containing the latest equipment for testing raw materials and production methods, and for developing new tests to assure customers that they will get insulators of extremely high quality.

Accurately Controlled Production

The latest precision production machinery has been installed. New, accurately controlled molding, pressing, drying, glazing, and firing equipment assure much more uniform production, and porcelain of greater uniformity in density and strength.

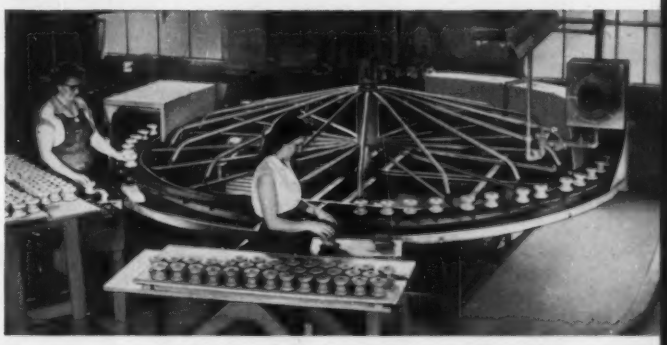
Our facilities include our own completely new, modern galvanizing plant for insulator hardware and fittings. This assures accurate quality control under our own supervision.

Amply Meet EEI-NEMA Standards

The result is that, today, porcelain insulators shipped from this plant are among the highest quality available in the industry. You can buy them with full assurance that you are getting porcelain insulators second to none. They meet EEI-NEMA standards with an ample margin of safety.

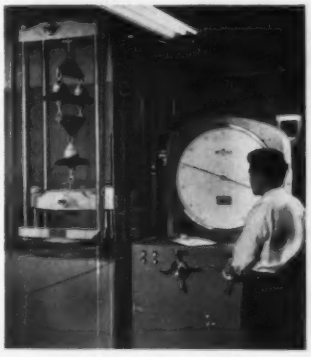
Get Complete Information

Illinois Electric Porcelain Company products include porcelain insulators, hardware, and fittings. These products are sold through Line Material Company. Ask the L-M Field Engineer for complete information, and a copy of the informative Bulletin DL8; or write Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).



Here's one of the newest developments at Illinois Electric. On this huge wheel, spool and pin type insulators and wireholders are automatically glazed on all sides and partly dried by warm-air circulation, insuring uniform, complete glazing.

Two huge automatic dryers gradually dry the formed porcelain. Heat and humidity are automatically controlled as the ware slowly passes through the dryers. This provides strong, dense ware, free from internal stresses.



Suspension insulators are subjected to simultaneous mechanical and electrical test to destruction—a test performed on a representative quantity of insulators to insure high quality.

A corner of Illinois' complete new ceramic laboratory. The laboratory contains the latest equipment for analyzing materials and testing production processes.

ILLINOIS ELECTRIC PORCELAIN COMPANY

(a McGraw Electric Company Subsidiary) • Macomb, Illinois

Distributed by **LINE MATERIAL** *Electrical Porcelain Insulators*

(a McGraw Electric Company Division)

222

17 Years of continuous service

prove Kuhlman Porcelain Enamel Transformers give positive protection against salt spray and corrosion

Utilities have used Kuhlman Porcelain Enamel Transformers since 1938. They report no deterioration in the enamel finish after 17 years of continuous service.

These units, serving in areas of heavy salt spray and industrial corrosion, have proven that Kuhlman porcelain enamel is far superior to ordinary finishes which corrosive atmospheres destroy in a short time. In every reported case, Kuhlman's exclusive finish is saving maintenance and repainting costs—shows no signs of rusting, cracking, or fading under the most severe conditions.

It is no wonder that Kuhlman porcelain enamel resists corrosion. Unlike paint, it is permanently fused to the tank metal at 1500° F forming a glass coating three times the thickness of ordinary paint. The resulting rock-hard surface makes an attractive, durable transformer finish—guaranteed to give you long life corrosion-free service.

For more facts about Kuhlman porcelain enamel transformers, write or ask for bulletin PB-140.

YOU GET THIS POSITIVE PROTECTION:

- Non-Corrosive external hardware
- Well protected support lugs
- Protected seams, welds, and bushing openings
- Heavy coating on the bottom of the tank

KUHLMAN ELECTRIC COMPANY

BAY CITY, MICHIGAN • CRYSTAL SPRINGS, MISSISSIPPI • SALINAS, CALIFORNIA

Here's a man who specializes in getting the job—any job—done. He's . . .

Dave Matson—Head of 18 Power Companies in Mexico

"At any moment Mac is liable to call me and say that 'the plant is out' at some such place. Then we have to go to work and get it fixed."

Earthquakes, hurricanes, floods, droughts, and revolutions have contributed to make the hectic career of David Hayse Matson one in which the rare has become routine.

Today, as president of Compania Impulsora de Empresas Electricas, Mexican subsidiary of American & Foreign Power Co, Matson helps guide 18 separate power companies.

These companies, all affiliates of Impulsora, serve the great mining districts of Chihuahua, the henequen factories of Yucatan, and Mexico's bread basket which centers around Guanajuato. Transportation needed to maintain and supply these power plants ranges from burros to helicopters.

In an operation as diversified as this, none of Matson's days are alike. "And I wouldn't have it any other way," he says.

"I don't know what I'd do with myself if I just had to come into the office and check how many of this or that we'd sold. Sure, I make plans about how I'm going to spend my office day. But at any moment 'Mac' (George S. McLaughlin, Impulsora chief engineer) is liable to call me and say that 'the plant is out' at some such place. Then we have to go to work and get it fixed. And all of my carefully laid plans go out of the window."

Aside from the unexpected, Matson makes almost weekly airplane visits to one or two of Impulsora's plants throughout the Republic.

Flying itself is an old story to Matson. He served as a World War I pilot and learned to fiy in an LWF (laminated wood fuselage).

"Say, do I have to tell you all this personal stuff? I've read a hundred of these so-called profiles, and they're all alike. I don't care if I never read another one," Matson said with a laugh.

Laughter comes easily to Impulsora's president, an athletic six-footer, who would much prefer that you call him Dave. Asked what he does for recreation, Matson mentions that he manages to play golf once or twice a month. Then later in the conversation it develops that he also water skiis, likes to skin dive and deep-sea fish, and has a fondness for walking and reading.

Speaking in a soft accent reminiscent of Roanoke, Va., where he was born April 18, 1897, Matson quickly reviewed his life.

"In high school in Roanoke, I worked summers for the Norfolk & Western Railway doing all sorts of jobs which touched the fringes of engineering. That gave me a head start when I studied engineering at the University of Texas in Austin. The First World War broke out and I went into training as an infantryman on the Mexican border. Later I was transferred to the Air Corps.

"After the war I studied commercial law at Washington & Lee University at Lexington, Va., and played some football and participated in track events.

"In 1924 I became manager of the Florida section of the Phoenix Utilities Co. Came 1928, and I was made chief engineer of the Florida Power & Light Co, where, incidentally, my brother, Duffield Matson, is an engineer today.

"I went to Argentina in 1929 as vice president and general manager of American & Foreign's holdings there to manage a major hydro-diesel-steam expansion program."

While in Argentina, Matson explained, he had to contend with several revolutions and an earthquake which destroyed the city of San Juan.

Once he led an expedition to the headwaters of the Rio Mendoza around Mount Aconcagua, the highest peak in the Andes. His mission was to ascertain the cause of the great flood that destroyed the Trans-Andean railway and the company's hydroelectric facilities.

Another Argentine adventure took place in 1943 when Dave Matson and some of his associates were jailed for several days. They were charged with participation in so-called "economic warfare."

In the spring of 1948 Matson was transferred from Argentina to Mexico. He and his wife, the former Frances Sheldon of Pearlsburg, Va., live in a Spanish colonial stucco house in Mexico City's Lomas section.

Commenting on the future of power demand in Mexico, Impulsora's president points to the fact that demand in many areas of Mexico is growing at a rate of 8% to 12% a year whereas average world growth is about 7%. To meet this demand, the 18 affiliates of Impulsora are being consolidated currently into six units or systems, and Impulsora is embarking on a four-year $40-million program of extension, expansion, and modernization.

Matson Cited by President

Matson's companies serve 400 communities from Mazatlan on the Pacific Coast to Merida, Yucatan, a distance of about 2,000 miles. Impulsora employees have strung power lines across deserts, through jungles, and between snow-capped peaks at 14,000 feet.

Employee relations are important in Matson's idea of successful company operations. And this special concern for employee goodwill paid off in a recent emergency.

Last October, Hurricane Hilda hit full force at Tampico on the Gulf of Mexico. Lines were snapped and poles uprooted. A few days later Hurricane Janet swept in with heavy floods. Impulsora dispatched a task force of linemen into Tampico on the first plane that went into the area and maintained an airlift (even drinking water had to be flown in from Mexico City) until emergency work was completed.

Mexican President Adolfo Ruiz Cortines complimented Impulsora for the rapidity with which it responded to the disaster. The linemen struggled so hard for so long that some of them actually fell asleep while working up on the poles.

After relating this escapade, Dave Matson laughed and said, "That's about all I can think of. I've told you too much already—at least too much about myself."

Yankee Ingenuity Pays Off for Matson

David H. Matson is a man of quick decisions.

He was put to the test recently when he couldn't get needed transformers in time. But Matson had the answer, and he proved that even in Mexico that old commodity known as Yankee ingenuity can really pay off.

Critical power shortages hit most of central Mexico during last year's dry season from April through early June. Mexican Power & Light Co had power to spare, but there was no line to carry it to Impulsora's customers. The answer was a 47-mile transmission line to send 20,000 kw of emergency or auxiliary power from Mexlight's plant at Lerma, near Mexico City, to Impulsora's Guanajuato system at Queretaro.

The power line was an absolute must this year, so Impulsora was forced to erect it during the rainy season. Matson purchased 400 used 45-ft steel towers from Mexlight and placed an order with Westinghouse Electric Corp for a 3-phase, 16,000-kva autotransformer.

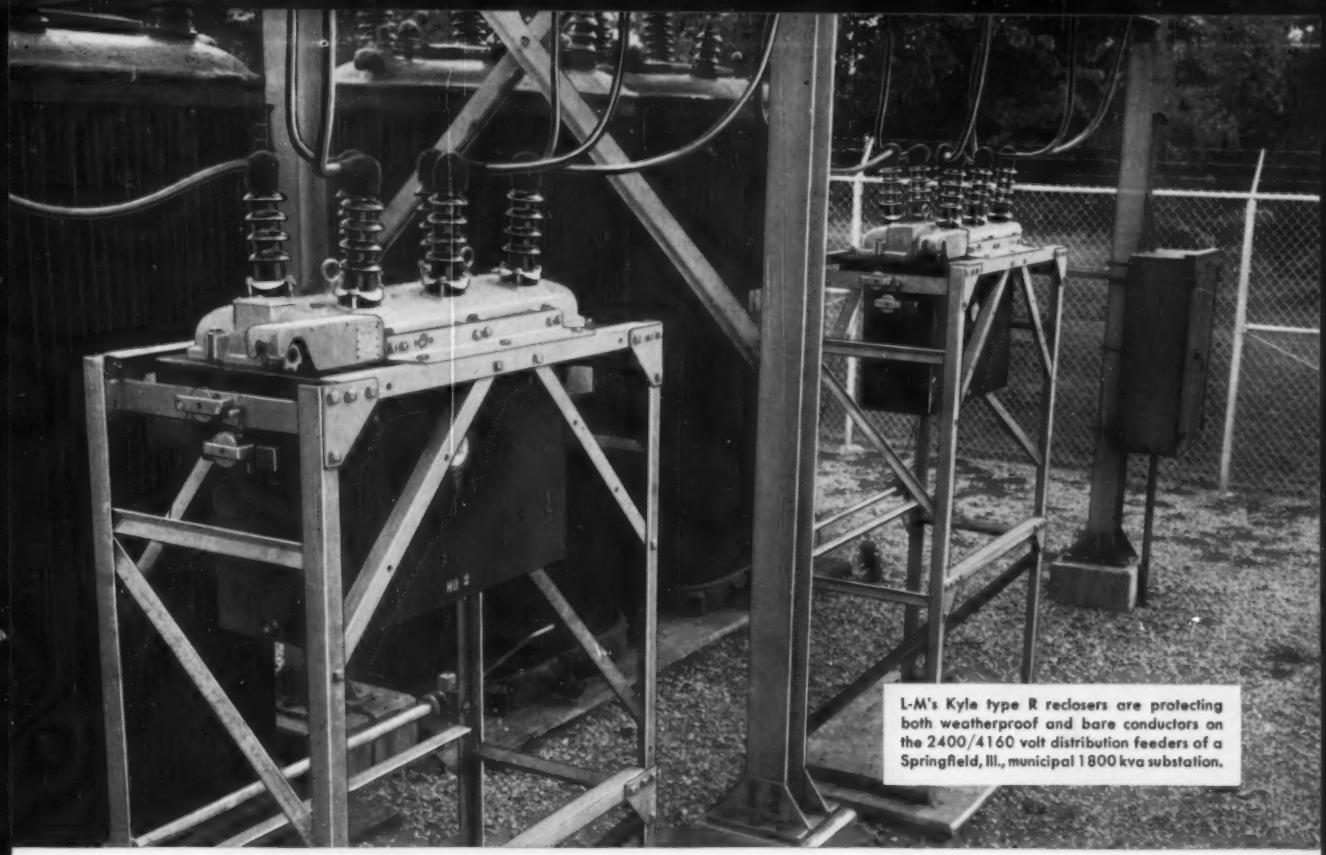
When Matson learned that he couldn't get the transformer as soon as he needed it, he went into action. On his request, a team of A&FP auditors checked the whereabouts of every comparable transformer built since 1915.

The auditors combed the United States. They telegraphed or phoned every owner on the records: "Do you still have the transformers? Are they in use? Would you like to sell them? No, it doesn't make any difference what condition they're in."

The nationwide quest ended at Muscle Shoals, Ala. Six comparable transformers were found lying in a yard and covered with weeds. They had been built in 1918 by Westinghouse. Tennessee Valley Authority had used them, and at this point they had been sold to a Los Angeles dealer.

Matson bought four of the six transformers and turned them over to the Westinghouse repair shop at Birmingham, Ala., for complete reconditioning. Then the three-ton transformers were shipped to Mexico by special railroad car.

The transformers were on the job in time. And Matson's Yankee ingenuity had paid off.



L-M's Kyle type R reclosers are protecting both weatherproof and bare conductors on the 2400/4160 volt distribution feeders of a Springfield, Ill., municipal 1800 kva substation.

Improve Service Continuity . . .

High-Speed Kyle Type R Reclosers Reduce Conductor Burn-Down

by **FRANK McSTAY**
Product Manager
Kyle Products
Line Material Company

The operating speeds of conventional circuit breakers in many cases do not interrupt transient faults fast enough to prevent burn-down of weather-proof conductors or loss of mechanical strength of bare conductors. For this reason, Line Material Company engineers have designed fault-protective devices with extremely fast opening characteristics that will *minimize permanent system faults* resulting from transient or non-persistent causes.

Reduce Damage Caused By Transient Faults

L-M Kyle reclosers are completely automatic and self-contained. They provide high-speed circuit clearing (2-cycle maximum). Up to 90% of transient or non-persistent faults can be cleared by Kyle reclosers with no significant damage to the system or interruption of service continuity.

Ratings from 25 to 400 Amps.

The Kyle type R heavy-duty three-phase oil circuit recloser, shown above, is designed to replace breakers in substations with up to 100,000 kva fault capacity. They are available in normal load ratings from 25 to 400 amperes, with symmetrical RMS interrupting rating up to 6000 amperes at 4.8 kv and below and 4000 amperes up to 14.4 kv.

Almost any supplementary relaying scheme is adaptable to the type R recloser for substation application. Units are available with ground tripping, shunt tripping, shunt lockout, and auxiliary switches for remote control indication or low-voltage control switching.

Kyle Type R 3-Phase Reclosers available in normal load ratings FROM 25 TO 400 AMPERES

Ratings Amps.	Min. Trip Amps.	Inter. Ratings RMS Amperes 4.8 kv	14.4 kv
25	50	1500	1500
35	70	2100	2100
50	100	3000	3000
70	140	4200	4000
100	200	6000	4000
140	280	6000	4000
160	320	6000	4000
185	370	6000	4000
225	450	6000	4000
280	560	6000	4000
400	800	6000	4000

Get the Whole Story On L-M's Kyle Reclosers and Sectionalizers

Ask your L-M Field Engineer for information and bulletins on Kyle apparatus and complete coordination—single and three-phase—from substation to load. Or write Line Material Company, Milwaukee 1, Wisconsin. In Canada: Canadian Line Materials, Ltd., Toronto, Ontario.

LINE MATERIAL Kyle® Reclosers

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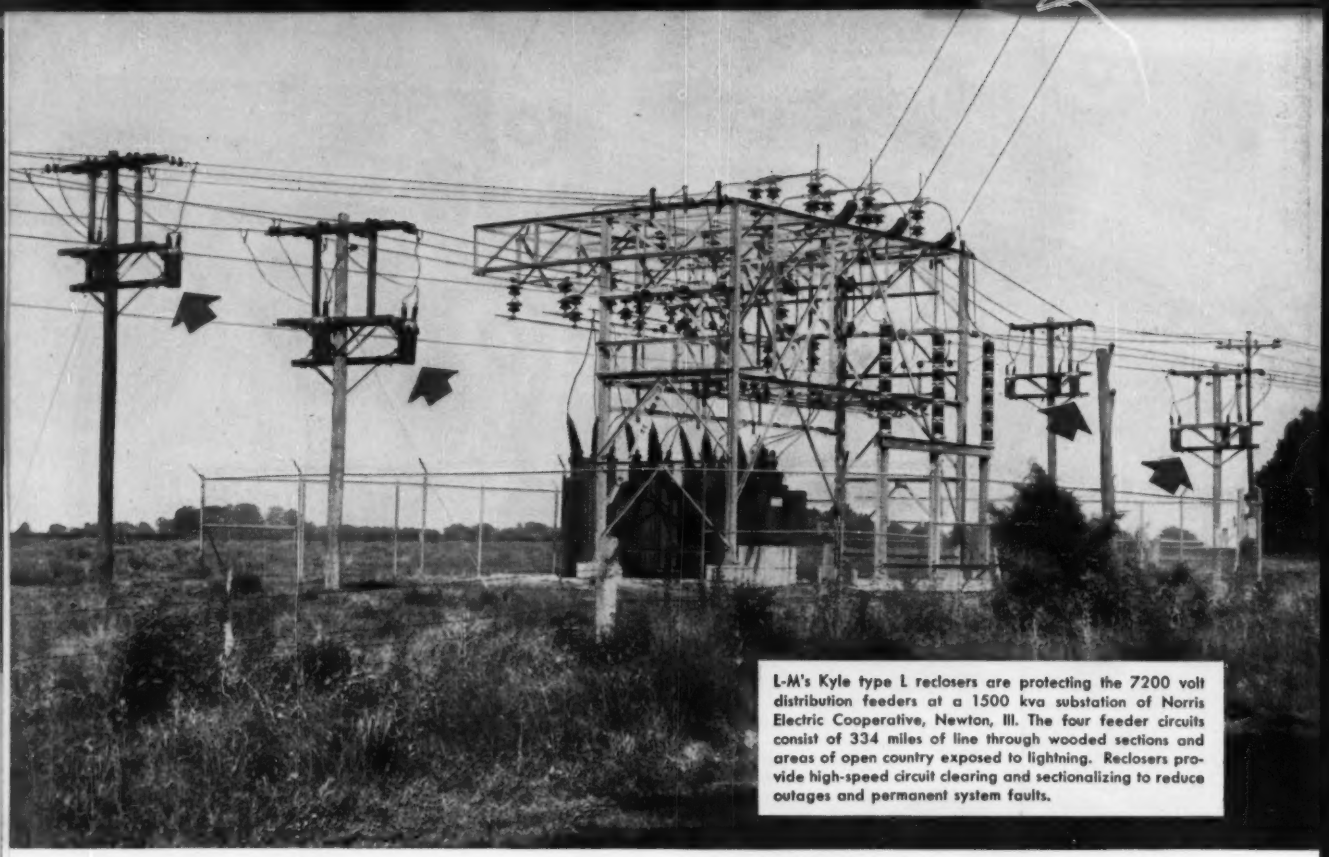

L-M's Kyle type L reclosers are protecting the 7200 volt distribution feeders at a 1500 kva substation of Norris Electric Cooperative, Newton, Ill. The four feeder circuits consist of 334 miles of line through wooded sections and areas of open country exposed to lightning. Reclosers provide high-speed circuit clearing and sectionalizing to reduce outages and permanent system faults.

Pole-Mounted Kyle Reclosers Serve As Automatic Disconnecting Device

L-M Kyle reclosers provide high-speed circuit clearing of feeders for transient fault protection and automatic disconnecting of permanent faults with minimum substation investment.

By **JOHN A. SCHWENKE**
Field Engineer
Springfield, Ill., Office
Line Material Company

The relatively high cost of circuit breakers and associated substation equipment has been eliminated at the Dieterich substation of the Norris Electric Cooperative, Newton, Ill. Kyle type L reclosers have been installed on the four 7200 volt distribution circuits to serve as the disconnecting device. These reclosers are completely self-contained and fully automatic.

In addition to segregating permanent faults from the system, L-M's Kyle reclosers provide the high-speed circuit clearing (2-cycles maximum) required to reduce conductor burndown resulting from transient or non-persistent causes.

Reduce Permanent Faults

Transient fault protection is available through coordinated operation of the substation recloser with reclosers and sectionalizing fuses on the feeders. It is possible to clear up to 90 percent of transient faults, reduce permanent faults, and secure these outstanding advantages with L-M reclosers:

- Less serious damage to conductors and equipment.
- Confining of trouble to small area.
- Increase revenue because outages are reduced.
- Greater service continuity.
- Aid in maintaining good public relations.

Kyle reclosers offer the widest choice of time-current characteristic curves and operating sequences. And only L-M offers the fully coordinated series of reclosers and sectionalizers that permits complete automatic protection.

Get the Whole Story on L-M's Kyle Reclosers and Sectionalizers

Ask your L-M Field Engineer for information and bulletins on Kyle apparatus and complete coordination—single- and three-phase—from substation to load. Or write Line Material Company, Milwaukee 1, Wisconsin. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.

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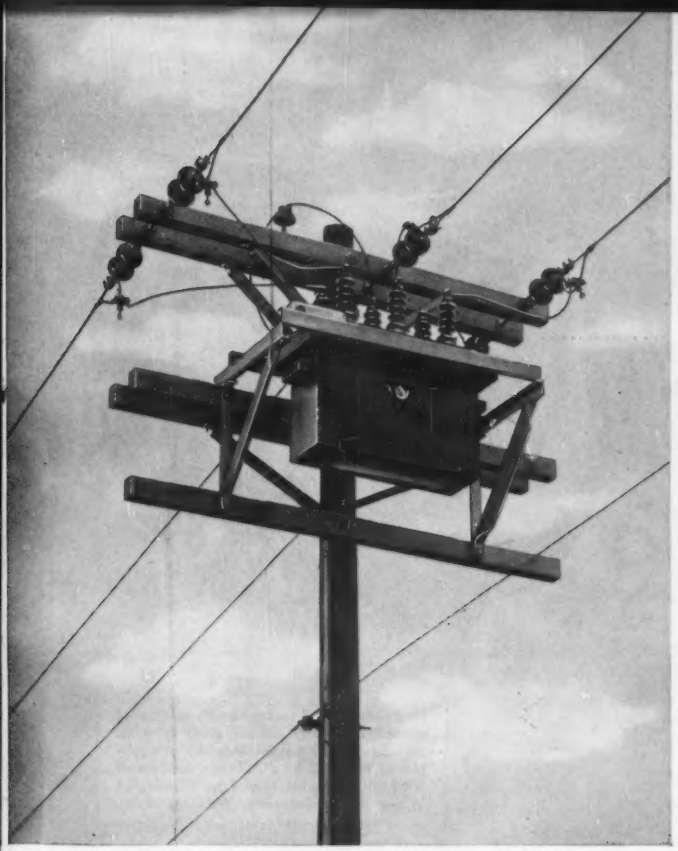
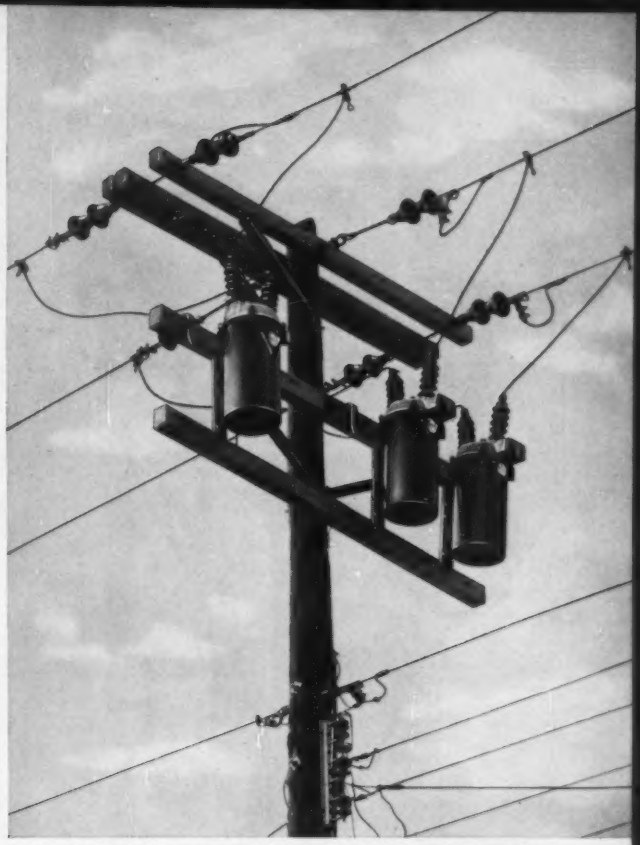
LINE MATERIAL Kyle® Reclosers

A McGRAW ELECTRIC COMPANY DIVISION



One of four pole-mounted Kyle type R three-phase reclosers that were installed in the initial area converted to 13 kv. The type R provides simultaneous 3-phase fault protection and fully coordinates with other types of Kyle sectionalizing equipment and with branch line fuses.



One of 13 Kyle type L single-phase recloser installations in the initial area converted to 13 kv. The installations involved over 2100 customers and protected 155 miles of line. Trees and animals were the primary hazards affecting operation of the distribution feeders.

Utility converts fringe area to 13 kv distribution system . . .

Conversion Plans Include Kyle Reclosers To Provide Transient Fault Protection

By **JAMES A. VARGA**
Field Engineer
Indianapolis Office
Line Material Company

Indianapolis Power & Light Company is accomplishing two objectives at the same time in their plans for converting to a 13 kv distribution system. This company is able to *serve heavier loads* on the existing system by going to a higher voltage. And second, it is providing *better service continuity* by installing L-M Kyle reclosers for completely coordinated transient fault protection.

L-M Kyle reclosers provide the high-speed circuit clearing (2-cycles maximum) required to reduce conductor burndown caused by transient faults. It is possible to clear up to 90% of transient faults and reduce permanent faults with Kyle reclosers.

All L-M Kyle reclosers can be coordinated in series by selection of coil size or sequence. They are completely automatic and self-contained, with operating sequences accurately controlled by the hydraulic timing mechanism.

Single- and Three-Phase Reclosers

The Kyle type L single-phase and type R three-phase reclosers are rugged, power-class reclosers designed for pole mounting or in substations. They offer the widest choice of time current characteristics—fast, retarded, and extra-retarded, with four operations to lockout in any of seven sequences. The ratings range from 25 to 400 amperes, with up to 100,000 kva fault capacity. Almost any supplementary relaying scheme is adaptable to the type R recloser for substation application. These include ground tripping, shunt tripping, shunt lockout, and auxiliary switches for remote-control indication, low-voltage control switching, or metering.

Get the Whole Story on L-M's Kyle Reclosers and Sectionalizers

Ask your L-M Field Engineer for information and bulletins on Kyle apparatus and complete coordination—single- and three-phase—from substation to load. Or write Line Material Company, Milwaukee 1, Wisconsin. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.

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LINE MATERIAL Kyle® Reclosers

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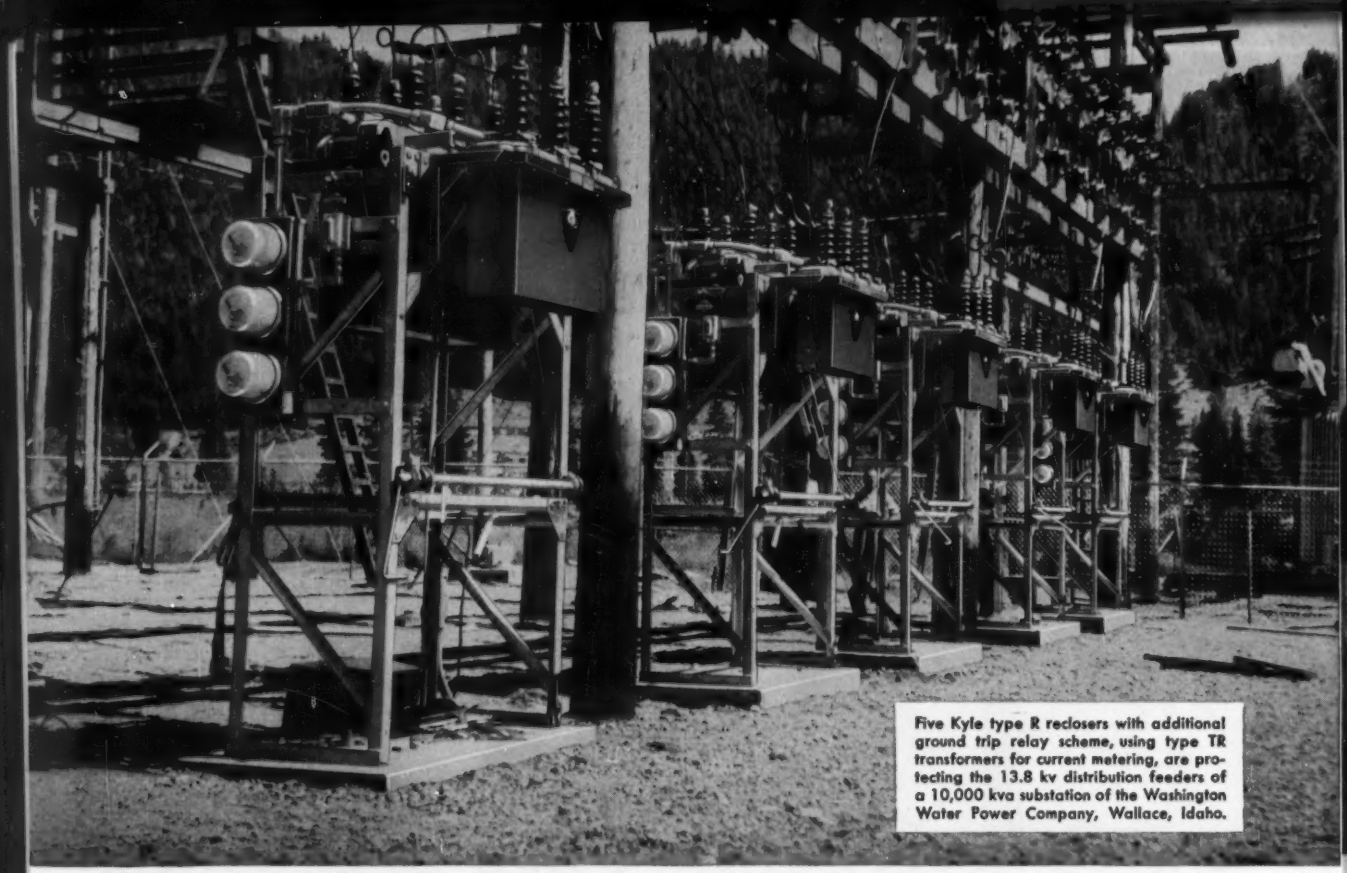

Five Kyle type R reclosers with additional ground trip relay scheme, using type TR transformers for current metering, are protecting the 13.8 kv distribution feeders of a 10,000 kva substation of the Washington Water Power Company, Wallace, Idaho.

Up To 90% Of Transient Faults Cleared . . .

High-Speed Kyle Type R Reclosers Help Improve Service Continuity

by **R. L. LEMMAN**
Apparatus Engineer
Line Material Company

L-M Kyle reclosers provide high-speed (2-cycle maximum) clearing of faults on the distribution system. This minimizes permanent system faults resulting from transient or non-persistent causes, and greatly improves service continuity. Up to 90% of transient faults can be cleared with Kyle reclosers with no significant damage to conductors.

Substation Applications

The Kyle type R three-phase recloser is a completely automatic, self-contained power class unit. Because the type R is a heavy-duty recloser it has applications in substations with up to 100,000 kva fault capacity.

The type R provides simultaneous tripping on all three phases of the feeder, to assure maximum protection against back feed or three-phase motor burnouts. Three time-current characteristics are available for series over-current tripping, with four operations to lockout in any of seven sequences. Normal reclosing time is two seconds. (25-cycle reclosing is available by simple field adjustment.)

Auxiliary Protective Schemes

Almost any relay scheme is adaptable to the type R recloser to supplement normal series over-current tripping.

Ground Trip Solenoid is a self-contained ground relay possessing its own dual time-current characteristics.

Shunt Trip Solenoid is a tripping device only, designed to operate the recloser when energized from a supplementary relay scheme.

Shunt Lockout Solenoid is a lockout device only; locks out the recloser instantly. Like the shunt trip solenoid it is energized by remote control.

Auxiliary Switch provides positions for remote-control indication or low-voltage control switching of apparatus used in conjunction with the type R recloser.

Ratings From 25 to 400 Amps.

The type R is available in normal load ratings from 25 to 400 amperes, with symmetrical RMS interrupting ratings up to 6000 amperes at 4.8 kv and below, and 4000 amperes up to 14.4 kv. Ratings can be increased in the field by simply changing the series trip coil.

Get the Whole Story on L-M's Kyle Reclosers and Sectionalizers

Ask your L-M Field Engineer for information and bulletins on Kyle apparatus and complete coordination—single- and three-phase—from substation to load. Or write Line Material Company, Milwaukee 1, Wisconsin. In Canada: Canadian Line Materials, Ltd., Toronto 13, Ontario.

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LINE MATERIAL Kyle® Reclosers

A McGRAW ELECTRIC COMPANY DIVISION

L. A. SCOFIELD

OTTO W. MANZ, JR

M. LeCOMPTE WARING

HARRY J. BAUER

EARL L. GRIFFITH

Consolidated Edison Re-assigns Executives

Consolidated Edison Co of New York, Inc, has announced several re-assignments of its executive personnel.

Vice President L. A. Scofield has been placed in charge of commercial relations in addition to retaining his supervision of Westchester County and Staten Island operations.

Otto W. Manz, Jr, previously vice president of purchasing, stores, and fuel, now has been appointed to direct sales.

Succeeding Manz as head of purchasing, stores, and fuel is Vice President M. LeCompte Waring, who formerly administered the company's operating functions.

Vice President Harry J. Bauer and Assistant Vice President J. Eliot McCormack are now in charge of operations, including production, distribution, system operation, substation operation, and test.

Earl L. Griffith, vice president in charge of construction and transportation, has assumed jurisdiction over commercial buildings.

North, Sayles Get New Commonwealth Posts

J. R. NORTH

Commonwealth Associates, Inc, a member of Atomic Power Development Associates, has created two management positions in conjunction with its recently organized Nuclear Department.

J. R. North, formerly chief electrical engineer and associated with Commonwealth since 1924, has been appointed executive engineer. In this post he will have responsibility for the coordination of all engineering services to clients.

E. V. Sayles, supervisor of the general engineering department of Consumers Power Co, joins Commonwealth in the new capacity of administrative and development engineer in charge of nuclear engineering activities.

E. V. SAYLES

Wagner Electric Promotes Ford, Widell

P. C. FORD

Wagner Electric Corp has announced the appointment of P. C. Ford as executive engineer. In his new position he will assume responsibility of the recently consolidated electric and automotive engineering and research facilities. Ford was formerly chief engineer of the company's Electrical Division.

Under the new organization, C. E. Widell was appointed director of research and development. Prior to this appointment Widell had been on special assignment with the engineering and research departments.

C. E. WIDELL

Teenage Utility Stockholder

Youngest stockholder to attend Central Maine Power Co's recent annual meeting was L. Smith Dunnack, Jr, a 13-year-old 8th grade student of Augusta, Me.

The teenage utility stockholder purchased his interest in Central Maine Power with money earned as a newsboy for the "Daily Kennebec Journal."

L. SMITH DUNNACK, JR

PERSONAL BRIEFS

Elbert O. Sowerwine, a vice president of Anaconda Co since 1945, retired recently after 49 years service with the company.

Donald E. Garr has been appointed manager of General Electric Co's Industrial Electronics Laboratory, a new unit in the company's Laboratories Department, Syracuse. He is former electrical engineering manager at the general engineering laboratory . . . New manager of GE's manufacturing operations service is **Neil E. Firestone,** who succeeds **John S. MacDonald,** recently named general manager, Distribution Assemblies Department. **Armand V. Feigenbaum** becomes manager of quality control service, a newly established component in Manufacturing Services . . . GE has appointed **Clare L. Beattie** supervisor of the instrumentation component for the electromechanical engineering unit of its Large Steam Turbine-Generator Department Materials and Processes Laboratory.

Sylvania Electric Products Inc has appointed **Charles A. Burton** to the newly created post of regional sales vice president.

Henry W. Smith has been made assistant general manager of British Columbia Engineering Co Ltd, a subsidiary of British Columbia Electric Co, where he had served as assistant chief engineer for the past nine years.

L. W. Hanson has been elected auditor of the Wisconsin Power & Light Co and **John E. Zwettler** has been named assistant auditor to succeed Hanson. Hanson will succeed Miss Mary A. McNulty when she retires on July 1.

W. C. Wainwright, vice president and assistant to the president of British Columbia Power Corp, has been elected president of Western Development & Power, Ltd, a subsidiary of the British Columbia. Western Development was formed in January to settle new industry in British Columbia.

John Ave, formerly assistant to the vice president at Plainfield, Ind., for the Public Service Co of Indiana, has been named manager of the company's Kokomo District, succeeding Karl A George, who is retiring.

Cloud Seeding Ups Hydro Output

(*Continued from page* 25)

of years with the same success, subsequent points will continue to fall well above the curve. These new points will give the basis for a new curve widely separated from the previous one. This new curve will reflect the new control-target relationships resulting from sustained cloud seeding.

As support of the results so far, a study was made of the rainfall pattern over the Iberian Peninsula during the first 15 months of cloud seeding. In the study, rainfall was expressed as a percentage of normal rainfall during the interval, based on official weather records for 30 years prior to the advent of cloud seeding.

During the 15-month study period, the interior of Spain and Portugal suffered severe drought. However, rainfall in the target area attained at one point a value of 156% of normal precipitation. This figure contrasted to much lower values elsewhere including coastal areas.

The study revealed that precipitation at the control stations was generally well below 100%. In some months rainfall was higher in the coastal areas than over the target. However, in most months the target area received far greater amounts of precipitation than either surrounding interior regions or the coastal areas.

The 15-month study illustrated that monthly variations in rainfall gradually balance out as the length of the record increases. The balancing process will continue over the years so that rainfall in all areas, except the target, will approach the normal. However, the increases in rainfall that are attributable to cloud seeding will be reflected ultimately—by the difference between rainfall within the target and that outside, both expressed as percentages of the normal.

Cloud seeding for stream flow improvement on Rio Alberche is one of six parts of a program started by Water Resources Development Corp in October 1952. Two other phases cover increased stream flow on Rios Jucar and Tajo, and three projects provide for increased rainfall for agriculture. The agreement with the Spanish Government calls for an initial five-year program of weather modification operations and training of Spanish nationals in cloud-seeding techniques.

Proven Leadership*

*IN 1955 . . . MORE UTILITIES BOUGHT

POWERS American

SERVICE BODIES

THAN ANY OTHER MAKE

HERE'S WHY! Powers-American builds *fine* service bodies . . . and *builds them to last.*

Powers-American can furnish the *just right* body for any service job—standardized for greatest economy . . . modified-standard, to fit individual job needs . . . custom-made, to meet specific operating requirements.

Whether you have one truck or the largest fleet . . . you'll find it worthwhile to get details from Powers-American next time you need service bodies for your operation.

SERIES 350 Bodies have an under-floor winch, a fold-over derrick, and an extension ladder. Compartments are equipped to carry a variety of service tools, parts, and materials.

SERIES 25 Bodies are available in standard models equipped specifically for telephone, electric, gas, or water meter installation and service.

SERIES 44L Bodies have same construction features as Series 44 Bodies described above . . . plus a shelf-equipped superstructure, available with or without roof.

SERIES 450 Bodies, designed for light duty construction and maintenance work, are equipped with a revolving aerial ladder, an underfloor winch, and an easy-to-use derrick.

SERIES 44 Bodies . . . in 75", 90", and 104" lengths . . . are designed for service work in any phase of the utility industry. Equipped with bins, racks, material hooks, and adjustable shelves. Available with optional items to fit individual work needs.

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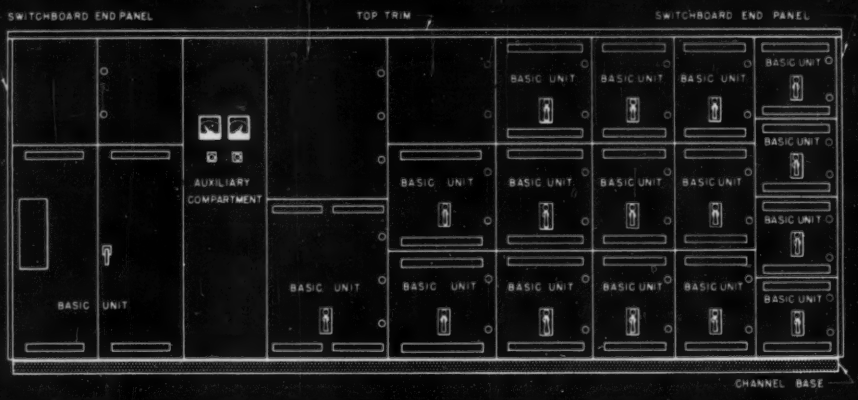
I-T-E Low Voltage Switchgear



--the finest of modern switchgear factory assembled, shipped as a unit, ready to install in your plant

I-T-E Low Voltage Switchgear provides the optimum in dependability, safety, reduced maintenance costs, and attractive appearance. I-T-E Circuit Breakers have proved their worth in thousands of applications. I-T-E Structures are designed specifically to house and interconnect these time-proved protective devices and auxiliary equipment. When you combine the two, you have the finest of circuit breakers in the finest of structures. And you get the additional advantages of less special engineering, faster delivery, and units custom-made in standard frames to fit your requirements.

For complete information, consult your nearest I-T-E sales office. Or write I-T-E Circuit Breaker Company, 19th & Hamilton Sts., Philadelphia 30, Pa.

I-T-E CIRCUIT BREAKER COMPANY • Switchgear Division

MEETINGS CALENDAR

JUNE

ELECTRICAL EQUIPMENT REPRESENTATIVES ASSOCIATION—Summer Meeting, La Playa Hotel, Carmel, Calif., June 20-23.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION—Accounting & Business Practice Section, Multnomah Hotel, Portland, Oregon, June 21-23.

PUBLIC UTILITIES ASSOCIATION OF THE VIRGINIAS—Accident Prevention Committee Conference, Hotel Roanoke, Roanoke, Va., June 22.

WISCONSIN UTILITIES ASSOCIATION—Accounting Section Convention, Schwartz Hotel, Elkhart Lake, Wis., June 24-26.

MICHIGAN ELECTRIC ASSOCIATION—Annual Convention, Grand Hotel, Mackinac Island, Mich., June 24-27.

ATOMIC INDUSTRIAL FORUM, INC.—Conference sponsored jointly with Denver Research Institute, Cosmopolitan Hotel, Denver, Colo., June 25-26.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Summer and Pacific General Meetings, Fairmount Hotel, San Francisco, California, June 25-29.

AMERICAN SOCIETY FOR ENGINEERING EDUCATION—Annual Meeting, Iowa State College, Ames, Iowa, June 25-29.

INTERNATIONAL ELECTROTECHNICAL COMMISSION—Deutches Museum, Munich, Germany, June 26-July 6.

AMERICAN CHIEF ENGINEERS' ASSOCIATION—Northwest Power Show, Minneapolis Auditorium, Minneapolis, Minn., June 28-July 1.

JULY

SOUTHEASTERN ELECTRIC EXCHANGE—Personnel Administration Section, General Oglethorpe Hotel, Savannah, Ga., July 12-13.

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION—Council Meeting, Geneva, Switzerland, July 16-21.

NATIONAL ASSOCIATION OF RAILROAD AND UTILITIES COMMISSIONERS—Annual Convention, Sheraton Palace Hotel, San Francisco, Calif., July 24-27.

COLUMBIA UNIVERSITY INDUSTRIAL & MANAGEMENT ENGINEERING DEPARTMENT—Fifth Annual Utility Management Workshop, Arden House, Harriman, New York, July 29-Aug. 10.

AUGUST

* **AMERICAN SOCIETY OF MECHANICAL ENGINEERS**—Heat Transfer Division, First National Conference, Pennsylvania State University, Aug. 11-15.

WESTERN ELECTRONIC SHOW AND CONVENTION—Pan Pacific Auditorium and Ambassador Hotel, Los Angeles, California, Aug. 21-24.

SEPTEMBER

NORTHWEST PUBLIC POWER ASSOCIATION, INC—Accounting Section, Cascadian Hotel, Wenatchee, Wash., Sept. 11-14.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—3rd Annual Electrical Conference of the Pretroleum Industry, Kansas City, Mo., Sept. 12-14.

EDISON ELECTRIC INSTITUTE—Organization Meeting, sponsored jointly with AGA, Edgewater Beach Hotel, Chicago, Ill., Sept. 13-14; Industrial Relations Round Table Conference, Drake Hotel, Chicago, Ill., Sept. 17-19; Meter & Service Committee, Purdue University, Lafayette, Ind., Sept. 24-26.

PUBLIC UTILITIES ASSOCIATION OF THE VIRGINIAS—38th Annual Meeting Greenbrier Hotel, White Sulphur Springs, W. Va., Sept. 14-15.

ILLUMINATING ENGINEERING SOCIETY—National Technical Conference, Hotel Statler, Boston, Mass., Sept. 17-21.

INSTRUMENT SOCIETY OF AMERICA—11th Annual Instrument-Automation Conference and Exhibit, New York Coliseum, Sept. 17-21.

ATOMIC INDUSTRIAL FORUM, INC—3rd Annual Forum Conference and 2nd Annual Trade Fair, Morrison Hotel and Navy Pier, Chicago, Ill., Sept. 24-28.

PENNSYLVANIA ELECTRIC ASSOCIATION—Annual Meeting, Hotel Wm. Penn, Pittsburgh, Pa., Sept. 25-26.

ELECTRIC COMPANIES PUBLIC INFORMATION PROGRAM—Steering Committee, Blackstone Hotel, Chicago, Ill., Sept. 26; Workshop Conference, Blackstone Hotel, Chicago, Ill., Sept. 26-28.

OCTOBER

EDISON ELECTRIC INSTITUTE—Prime Movers Committee, Hotel Radison, Minneapolis, Minn., Oct. 1-3; Electrical Equipment Committee, Hotel Statler, Cleveland, Ohio, Oct. 15-16; Transmission and Distribution Committee, Hotel Statler, Buffalo, N. Y., Oct. 18-19.

ILLINOIS INSTITUTE OF TECHNOLOGY—12th Annual National Electronics Conference, sponsored jointly by AIEE, Institute of Radio Engineers, University of Illinois, and Northwestern University, Hotel Sherman, Chicago, Ill., Oct. 1-3.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Fall General Meeting, Morrison Hotel, Chicago, Ill., Oct. 1-5.

* **CANADIAN ELECTRICAL MANUFACTURERS ASSOCIATION**—12th Annual Meeting, Sheraton Brock Hotel, Niagara Falls, Ontario, Canada, Oct. 3-5.

* **STANDARDS ENGINEERS SOCIETY**—Fifth Annual Meeting, Hotel Willard, Washington, D. C., Oct. 3-5.

INDIANA ELECTRICAL ASSOCIATION—Annual Convention, French Lick Springs Hotel, French Lick, Ind., Oct. 3-5.

SOUTHEASTERN ELECTRIC EXCHANGE—Sales Conference, Tides Hotel & Bath Club, St. Petersburg, Fla., Oct. 3-5.

INTERNATIONAL ASSOCIATION OF ELECTRIC LEAGUES—Sheraton-Cadillac Hotel, Detroit, Mich., Oct. 3-6.

ROCKY MOUNTAIN ELECTRICAL LEAGUE—Annual Fall Convention, Broadmoor Hotel, Colorado Springs, Colo., Oct. 7-10.

INTERSTATE POWER CLUB—Hotel Martinique, New York, New York, Oct. 8.

ILLINOIS INSTITUTE OF TECHNOLOGY—Conference on Computer Applications, Chicago, Ill., Oct. 9-10.

INTER-INDUSTRY FARM ELECTRIC UTILIZATION COUNCIL—National Power Use Workshop, Milwaukee Auditorium, Milwaukee, Wis., Oct. 15-16.

* **AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS**—Electrification of Machine Tools Conference, Sheraton-Gibson Hotel, Cincinnati, Ohio, Oct. 22-24.

UNIVERSITY OF TEXAS—Ninth Power Distribution Conference, University Batts Auditorium, Austin, Tex., Oct. 22-24.

AMERICAN STANDARDS ASSOCIATION—38th Annual Meeting and 7th National Conference on Standards, Hotel Roosevelt, New York, Oct. 22-24.

* **NATIONAL SAFETY COUNCIL**—44th National Safety Congress & Exposition, Chicago, Illinois, Oct. 22-26.

NOVEMBER

* **NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION**—Annual Meeting, Traymore Hotel, Atlantic City, Nov. 12-16.

* **EDISON ELECTRIC INSTITUTE**—Industrial Relations Committee, EEI Headquarters, New York, N. Y., Nov. 15; Accident Prevention Committee, Statler Hotel, Hartford, Conn., Nov. 26-28.

* **AMERICAN SOCIETY OF MECHANICAL ENGINEERS**—22nd National Exposition of Power and Mechanical Engineering, Coliseum, New York, N. Y., Nov. 25-30.

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* Additions this week.

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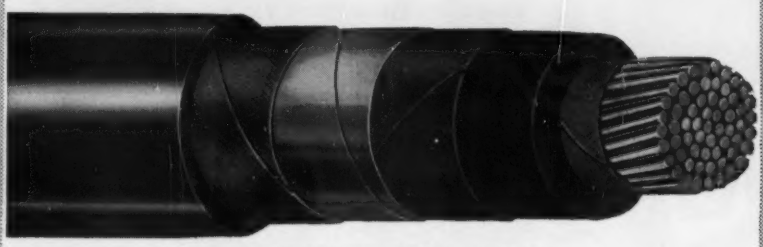


RoZone insulated, RoSeal sheathed, shielded power cable for high-voltage application through 15 kv.

CURRENT TRENDS
One of a Series

Why a Thermoplastic Sheath on Rubber Insulated Shielded Power Cable?

When you buy shielded power cable you don't generally inquire, "why have a sheath at all?" But it would be a fair question, answered something like this:

You (and we) expect a nonmetallic sheath on shielded power cable to:

1. Protect the insulation and shield during installation.
2. Be equally satisfactory for use in ducts, buried directly in earth and aerially.
3. Resist weather and soil conditions.
4. Have adequate moisture resistance.
5. Be easy to pull, handle, install.
6. Resist burning.
7. Be flexible enough for installation at sub-zero temperatures.
8. Be durable and homogenous.

Originally, braids and lead

Early efforts to meet these requirements involved fabric braids or lead sheaths. Braided coverings were relatively inexpensive; but they rapidly oxidized and rotted. Lead was (and is) a fine protector; but it was costly, hard to handle, it corroded, and was easily damaged.

Next, Neoprene

In 1932, a few cable makers began using Neoprene instead of the conventional older materials. As a sheathing material, Neoprene offered definite advantages over lead and braids. Obviously, Neoprene solved the rotting problem with braid. And, used in place of lead, Neoprene has cut cable cost, made handling easier, and resisted damage better. It provided oil, flame and sunlight resistance when used over rubber.

Next problem, shielding

But at certain voltage levels the electrostatic shielding formerly provided by lead sheathing was still needed. The IPCEA shielding recommendations were established and the logical solution to achieve the shielding effect was a metallic tape wrap between the insulation and the nonmetallic sheath.

The solution

After years of research, we developed a material of which we're very proud. Its name is RoSeal and it is a thermoplastic. Applied over premium quality RoZone insulation, RoSeal is a completely satisfactory sheath for shielded cable rated up to 15 kv.

Here's what you'll get from RoSeal

1. A rugged protective covering with toughness and other good mechanical properties.
2. Resistance to attacks from any micro-organisms.
3. Resistance to weathering and soil conditions (equal to Neoprene).
4. Exceptional moisture resistance (superior to Neoprene).
5. Much easier pulling (RoSeal's friction coefficient is lower than that of any other sheathing material because of its waxy structure). Pulling lubricants not generally required.
6. Flame resistance.
7. Easy bending (superior to Neoprene) and installation at sub-zero temperatures.
8. Durability and long life (equal to Neoprene).

And lower cost, too

This new development, RoSeal, offers you an additional benefit due to the inherent economy of RoSeal sheath as compared with Neoprene.

Other advantages

In every test, you'll find that RoZone insulated, RoSeal sheathed cable has uniformly high corona levels and electrical properties.

You'll find that RoSeal has greater resistance than Neoprene to oils and most chemicals and immeasurably better moisture resistance.

This advantage is of considerable importance in industrial applications and for direct burial in earth.

What RoSeal looks like?

Installation procedures for new RoZone-RoSeal are the same as for Neoprene sheathed cable. Its general appearance is the same, as are dimensions, ratings, and everything else.

You can use RoZone-RoSeal aerially, in ducts, and installed directly in earth.

Send for data

Detailed specs and engineering data are yours for the asking.

ROME CABLE CORPORATION, Rome, N. Y.

Mexlight Wins Victory over Labor

Industrial management in Mexico hails utility's successful fight for concessions from unusually strong labor union

GEN WILLIAM H. DRAPER, JR

(McGraw-Hill World News, Mexico City)—Mexican Power & Light Co won an important victory recently for Mexican industrial management in general.

In labor contract negotiations, which were settled just a few hours before a strike deadline, Mexlight won from the union concessions giving the company more of a voice in its own management.

The union, Sindicato Mexicano de Electricistas, still enjoys an unusually strong position. This strong position dates back to 1936 when, under the President Lazaro Cardenas administration, unions could do no wrong. At that time, Mexlight suffered a 10-day strike and the threat of expropriation was growing stronger. So the company, largely owned by Canadian, United States, Belgian and English capital, acceded to union demands in order to stay in business.

The Sindicato has clung to this strong position while widening its economic demands when contracts were renegotiated every two years.

In years past, Mexlight had asked for concessions at the same time the union presented its demands. Heretofore, however, company demands were frustrated. After all, in a pro-union political atmosphere held over from the Cardenas regime, it didn't behoove a largely-foreign firm to force issues to a strike.

This year, however, Gen William H. Draper, Jr, board chairman of Mexlight, and an old hand at fighting in difficult situations, steadfastly refused to back down. Mexlight's demands were modest and the few concessions won are important primarily because they serve notice that the unions no longer are held to be untouchable. Furthermore these concessions are steps toward greater company efficiency and improved service to Mexlight's 600,000 consumers.

Concessions won include union permission to mechanize accounting procedures and withdrawal of opposition to the company's new branch offices with non-union supervisors.

Mexlight is particularly thankful to the Mexican Ministry of Labor for its impartial arbitration of final-hour negotiations. This attitude on the part of the government is important also because it underscores again President Adolfo Ruiz Cortines' administration policy of giving capital an even break.

Needless to say, the Sindicato won concessions, but these were economic. Because of the rising cost of living, Mexlight was willing to grant wage increases. The union demanded a 25% general wage hike and settled for a 17% general increase. Also, other fringe benefits will boost total increased costs under the new contract to about $4.8 million over the next two years. Initial union demands, if all had been granted, would have increased costs some $15.4 million.

Since Mexlight is the largest private enterprise in Mexico, supplying some 40% of the nation's light and power needs, Mexlight-union settlements tend to set a pattern for labor-management contracts in several industries. During recent negotiations many industrial leaders here privately expressed admiration of Mexlight for standing up to the Sindicato.

After the new contract was signed, a Mexlight spokesman commented that the modest concessions won would not only lead to better consumer service but also now that the union has recognized that the company, too, has a few rights, there could be a reasonable expectancy that labor-management relations would improve.

Five Electric Companies Get Management Awards

The 1956 Manual of Excellent Managements of the American Institute of Management has singled out these five electric companies as "deserving particular merit for excellence in one or more of the institute's areas of management appraisal:

• Detroit Edison Co is cited for its carefully planned and fruitful research and development activities.

• Hartford Electric Light Co is mentioned for exceptional sales success, and the degree to which effective management in that area aided in the entire effort.

• Pacific Gas & Electric Co and the Cleveland Electric Illuminating Co are both singled out for consistent efforts to deal fairly with their stockowners, with PG&E being further cited for the quality of its executive personnel, unity of command, executive training and the general harmony present, and CEI for its growth, reputation, and contribution to the national economy.

• Pacific Power & Light Co, in addition to being noted for both its economic function and executive staff, is cited for a noteworthy production record, obtained through both prudent employment of physical facilities and healthy employee relations.

DISTRIBUTION TRANSFORMERS

THIS CONNECTOR

COULD SAVE YOU...$60

Estimate your possible savings in terms of all transformers on your lines

It's an old story to many utilities—customer complaints about radio or TV interference. And it's an expensive story, too—at an average of $30 a service trip. In fact, it often takes a couple of calls—for a total of $60—before the real villain is revealed. That villain is "cold-flow"—the tendency of aluminum to yield causing loose connections. A little multiplication of the number of transformers on your lines will prove that "cold-flow" can be a costly nuisance.

G-E connectors save you those service trips. G-E connectors counteract "cold-flow" of aluminum conductors, give an extra-tight grip on copper conductors. Low-voltage bushings have two coned-disk stainless steel washers which automatically maintain high pressure. High-voltage, tank-wall bushings achieve the same result with an internal, stainless steel follow-up spring.

Even if you don't use aluminum conductor, you still want assurance of tight connections. The new G-E connectors can save costly service calls.

Look at the other money-saving features offered by G-E distribution transformers: **Impulse testing** saves years of transformer life. **One-piece clamping bands** save maintenance time. Reusable **Nitrile rubber gaskets** help save units from contamination. **Strenicor terminal clamps** save terminals from breaking. **Super Melaglyp paint** saves up to two repaintings. **Nationwide warehouses** save utilities heavy inventory expense. **Service shops** can cut your repair and rebuilding costs.

For the complete story contact your nearest G-E Apparatus Sales Office or G-E Agent—or write to General Electric Company, Section 431-39, Schenectady 5, New York.

dollar-saving features prove ATANA*

*ALL TRANSFORMERS ARE NOT ALIKE
(make this simple comparison and see)

FEATURE	General Electric	Mfr. A	Mfr. B	Mfr. C	Mfr. D	Mfr. E
Production-line impulse testing	√			√		√
Nitrile rubber gaskets	√					√
One-piece clamping band	√					
H-v and l-v terminals handle both copper and aluminum conductors	√					
Strenicor pressure terminal clamps	√					
Super Melaglyp paint	√					
More than 100 warehouses	√	√				
Nationwide, company-operated service shops	√	√				

Progress Is Our Most Important Product

GENERAL ELECTRIC

After the sale . . .

Who Will Take Care of It?

• Appliance servicing today is bound closer than ever to the utility's interest. Appliances out of operation are costing thousands of dollars in ill will and lost load

• Here's a report on customer service complaints, the underlying causes, and what is being done about them.

FRED A. COMPTON, Chairman, Appliance Sales and Service Committee, Association of Edison Illuminating Companies

Too many customers don't know where to get their appliances fixed. Rising labor costs are pushing up the price of repairs. Service houses can't stock all the thousands upon thousands of parts needed to cover every job. Service men have a tough time keeping up with the changes in models.

This is the story of appliance servicing today. And with the rapid changes taking place in the marketing pattern, utilities are finding themselves wrapped up in the service function like they never have been before.

In this article, Fred A. Compton, vice president, Detroit Edison Co, and chairman of the Association of Edison Illuminating Companies' Appliance Sales and Service Committee defines the problems and describes the part the utility must play. Based on a survey among 30 utilities, his report attempts to answer questions like these:

- How widespread is the trouble?
- What are the biggest causes of unsatisfactory service?
- Who, if anyone, is to blame?
- What can the utility do about it?

Appliance service methods differ widely from state to state, even from city to city, according to our survey of 30 utilities.

In some areas the utility provides the service while in others service is handled by distributors and dealers. Still others rely on combinations of utility, dealer, distributor, manufacturer, and independent agencies. There are hundreds of possible combinations and it seems that we have a little of all of them.

But that's not the half of it. Scope of service rendered is just as varied. Some areas, we found, were serviced almost completely by utilities. In others, the utility serviced only those appliances sold in its own shops; what they had not sold, they referred to a dealer or distributor or manufacturer's agent.

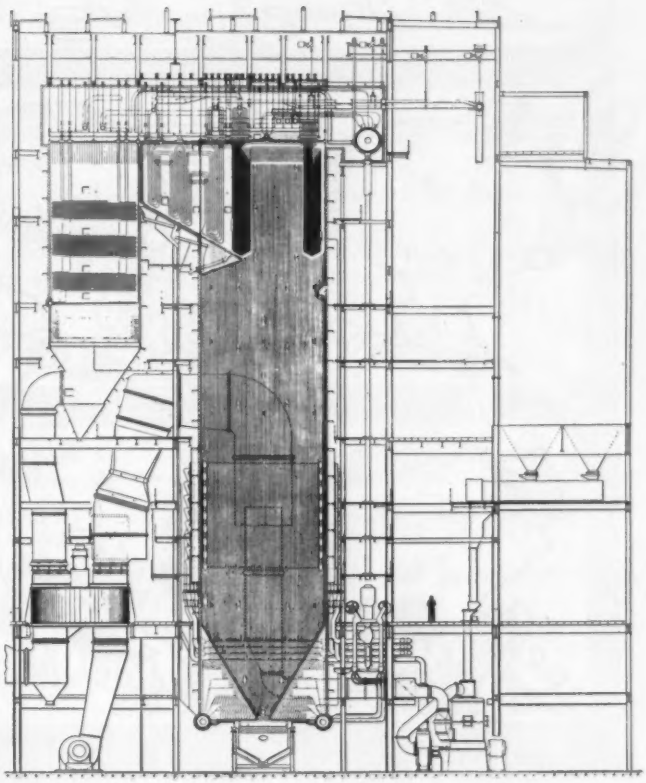
In still other areas, servicing was provided by the distributor during the period of warranty: the customer had

(*Continued on page* 48)

WILL COUNTY STATION

Commonwealth Edison Company

C-E controlled circulation boilers



The C-E Unit shown above is presently under construction for the Will County Station of the Commonwealth Edison Company near Joliet, Illinois. Stone & Webster Engineering Corporation are the Consulting Engineers.

This boiler is designed to serve a 260,000 kw (net capability) turbine-generator operating at a throttle pressure of 2000 psig with a primary steam temperature of 1050 F, reheated to 1050 F.

It is of the controlled-circulation, radiant reheat type with a separated furnace arrangement. Secondary superheater surface is at the outlet of one furnace and reheater surface at the outlet of the other. Primary superheater sections and economizer surface follow both the secondary superheater and reheater surfaces. Regenerative air heaters follow the economizer surfaces. The section shown above is taken through the superheater furnace.

Pulverized coal firing is employed, using bowl mills and tilting, tangential burners.

B-939

C-E

COMBUSTION ENGINEERING, INC.

Combustion Engineering Building
200 Madison Avenue, New York 16, N. Y.

STEAM GENERATING UNITS; NUCLEAR REACTORS; PAPER MILL EQUIPMENT; PULVERIZERS; FLASH DRYING SYSTEMS; PRESSURE VESSELS; HOME HEATING AND COOLING UNITS; DOMESTIC WATER HEATERS; SOIL PIPE

SAD SAGA OF SERVICE WOES: It's the Utility's Problem, too

to go elsewhere after the warranty expired. In almost all parts of the country we found that there was scattered dealer servicing. And then there were independent service agencies which would handle only certain makes of appliances; for the others, the customer had to shift for himself. While manufacturers' service centers generally provided excellent service facilities in the metropolitan centers, rural customers were finding it difficult to get any service at all.

Discount house purchasing and builder sales have been a headache as well. Where are these people to go for service? True the manufacturer or distributor sometimes provides service in builder sales; and occasionally —but only occasionally—a customer gets a service policy from a discount house. But it's not the rule; it's usually the exception.

Is it small wonder then that we have on occasion confused, frustrated customers? We really do not provide any consistent, unified, coordinated appliance service.

The question is: What are we going to do about it? What about quality of service, for example? According to our survey, quality varies almost as much as methods in appliance service. Specifically, complaints about service seem to fall into three major categories: 1. Cost is too high; 2. Too much time is needed for repairs; 3. Servicemen lack parts.

Let's take a look at each of these. First, the high cost of service. We all know that labor rates have gone up; but besides that appliances today are much more complex than they were years ago. This means that repairs made today are more complicated although the housewife doesn't always accept the idea.

But there is still another difficulty. Why is it that some washing machines require the replacement of an entire transmission—at a cost of $50 to $75

to the customer—when a simple 15¢ spring would effect a complete repair? Is this expense really necessary? Couldn't it be avoided?

A major replacement like that takes time as well, which brings us to the next point of contention, the time required to complete repairs. Sometimes a repair is necessarily complicated and time consuming. But it does seem that some of the time could be lopped off if we really tried. Take the lint problem in clothes dryers, for example. Lint accumulates around the bearings and stops the drum. Ideally, cleaning out the lint ought to take 15 to 20 min. But if it is necessary to tear the machine apart first—and it frequently is—the customer faces a lengthy and expensive repair.

Can't Afford Upkeep

Think for a moment of the customer's reaction. A dealer has gone to a lot of trouble and expense to sell an appliance. He is pleased, and his customer is pleased. The customer has bought on an easy payment plan which allows him to put only a few dollars down and pay the balance over several months. But what happens then? The customer takes the appliance home, and if for some reason it needs service or repair, it may cost him $50 to $75—and the terms are cash. So here is a case where a customer can afford to buy an appliance, but he cannot afford to keep it in operating condition.

And then there's the old bugaboo, lack of parts. Almost all answers to our questionnaire cited this as a major problem. It seems that except for the very large centers most service agencies just cannot carry enough parts to handle all repairs. This means sending for parts and waiting. Frequently there is no place short of the factory to get them. It seems that even the distributors are not able to carry complete stocks. The situation is all the more acute in rural areas.

Deeper Troubles

Each one of these three complaints is a problem, but even so, they are not the basic trouble. They really are only symptoms of a deeper difficulty. After a little digging we found that four factors were causing a bottleneck in the appliance service business: 1. Design; 2. Standardization; 3. Training; 4. Consumer instruction.

Design of an appliance poses complicated problems. First of all, an appliance must have "eye appeal" or "sales appeal." Second it must be designed so it will perform easily and effectively the function for which it was intended. In both of these, the manufacturers have done an outstanding job. However, there is a third requirement which is sometimes overlooked. Appliances should be designed so that parts are accessible to the serviceman, and repair should be made as simple as possible.

Examine some of the houseware appliances such as irons, toasters, and percolators. In some models of toasters, for example, the cover must be removed to touch any working part. So, for every adjustment, no matter how small, the serviceman must wait for the toaster to cool, make the adjustment, and then replace the cover for testing. It happens that the cover affects the temperature, so that a test without the cover is unreliable. And it all takes time.

A little thing? Individually yes, but not when you are talking about several hundred thousand repairs a year. Similar problems exist for the major appliances, too.

Now let's consider standardization of parts. Here is where things really get bogged down—at least in the service shop where it is necessary to stock a parts inventory of some 15,000 items. To provide complete service facilities, the serviceman must stock 1,000 items for 50 different makes of irons and more than 425 separate stock items for 40 different makes of space heaters, just to name two at random. It ought to be possible to standardize some of the parts, or to at least reduce the number of types.

(*Continued on page* 51)

The Bugs in Appliance Service

Customer Complaints center around:

High Cost — Rising labor costs and increasing complexity of appliances send consumers' cost of repairs upward

Too Much Time Needed — Growing dependence on an appliance breeds customer irritation at delays

Lack of Parts — Most service agencies can't carry enough parts to handle all repairs. Time is lost while "sending away"

They are caused primarily by these bottlenecks:

Design — Various parts of the machinery should be made easier to get at. Repair job should be made simple as possible

Standardization — Today's service shop must stock at least 15,000 items in its parts inventory. Number of parts should be standardized, reduced, made interchangeable with other makes and models

Training — Serviceman is hard put to keep up with rapid changes in huge number of appliance models

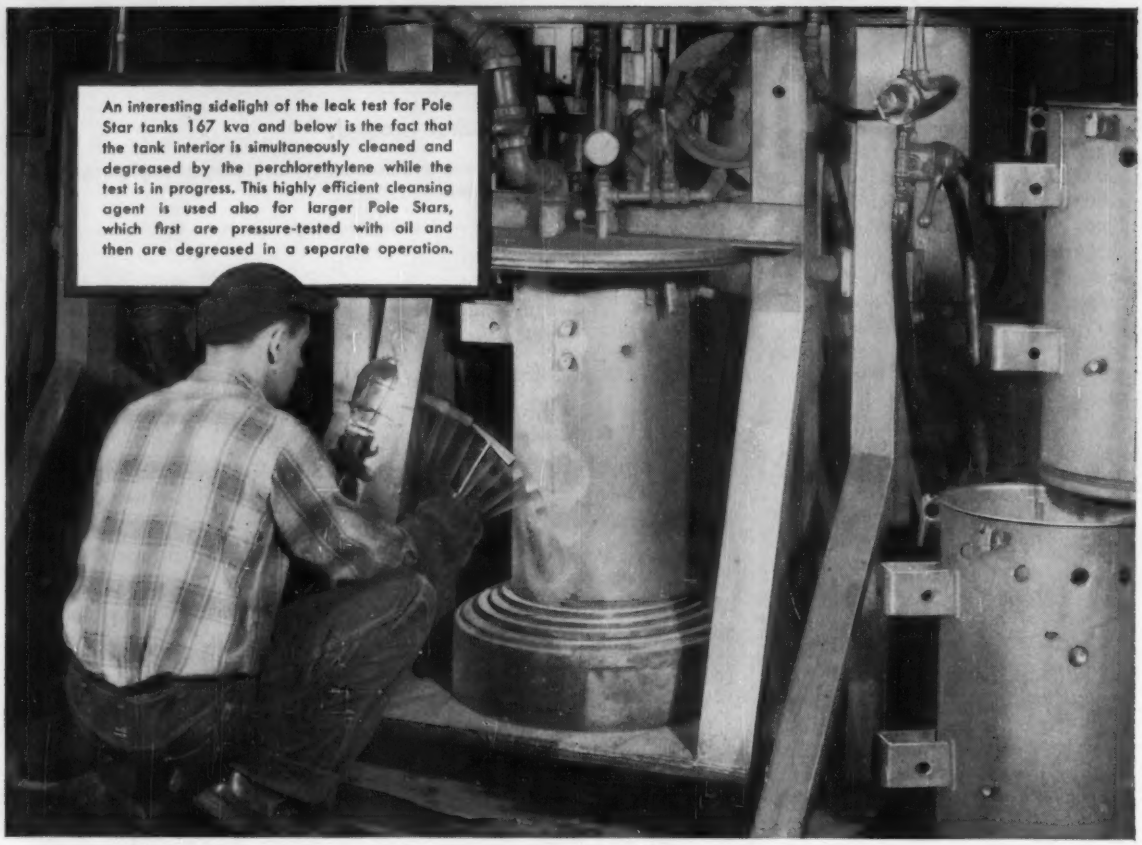
Consumer Instruction — Buyer doesn't help matters. Too often he doesn't bother to read instructions — or else can't understand them

What is Being Done About It

1. **Committee to be Formed** — Plans shaping for joint AEIC-NEMA committee with members drawn from manufacturers, dealers, distributors, and utilities

2. **Probe will be Made** — Committee with appointed subcommittees will study entire service problem

3. **Plan of Action Forthcoming** — Formal report and recommendations to be developed and presented to industry



An interesting sidelight of the leak test for Pole Star tanks 167 kva and below is the fact that the tank interior is simultaneously cleaned and degreased by the perchlorethylene while the test is in progress. This highly efficient cleansing agent is used also for larger Pole Stars, which first are pressure-tested with oil and then are degreased in a separate operation.

He's hammering all welds—under pressure—to leak-proof your POLE STAR tanks

In this age of complicated testing equipment, the "hammer" leak-detection test for Pole Star distribution transformer tanks seems almost primitive in its simplicity. Actually, it is a highly effective production-line procedure that has definite advantages over other methods of leak detection.

After all welds have been dusted with blue chalk, the tank is filled with perchlorethylene to a hydraulic pressure of 15 psi . . . then, all welded seams and joints are rapped sharply with a hammer while the workman, using a portable light to eliminate shadows, inspects the chalk areas for easily detected dark spots, which indicate leakage.

Vibrations set up by the hammer, as well as the force of the blows themselves, cause minute separations at any burned or insufficiently welded areas that might go unnoticed in tests using only internal pressure. Because of the low surface tension of perchlorethylene (it has a greater tendency to "spread" than do most liquids, including water), the liquid penetrates even microscopic openings.

When a leak is detected, the tank is returned to the welding department. After the faulty weld has been corrected, the tank must undergo complete re-inspection for possible leaks before finally being given the Pole Star stamp of approval.

167 Production Controls make Pole Star Best!

PENNSYLVANIA TRANSFORMER COMPANY

A McGraw Electric Company Division **CANONSBURG, PA.** *Greater Pittsburgh District*

Pole Star Transformers are available in all standard single phase distribution sizes from 3 through 500 kva, through 67,000 volts.

Appliance Service

(*Continued from page* 49)

Another phase of standardization is the number of tools required. More than $300 worth of special tools are needed to make repairs on one make of coffeemaker. This is in addition to the usual hand tools ordinarily used on this kind of a job. With a few items like this, the inventory in tools alone is a financial load for the service organization.

Parts standardization is even more important for major appliances. Ranges for example come in some 40 makes and over 2,100 models. The repair shop has to carry over 4,000 different stock items to service them all. Take the convenience outlet. That would seem to be a very simple part. And yet, believe it or not, there are about 60 different types in common use.

Would it not be possible to eliminate many of these parts? Couldn't there be some degree of inter-changeability among models; or even among different makes?

Why, for example, would it not be possible to standardize relatively unimportant things — unimportant from the sales appeal standpoint? Right now there are about 200 different types of switches. Couldn't the same variations in style be achieved with 20 or 30 switches?

Standardized Mountings

We suggest that no one would suffer if all appliance motor mountings were standardized. If a quick and easy exchange were possible, the serviceman could carry a loaner motor or two with him when he leaves in the morning and the housewife would not be deprived of her washer or dryer at the time when she needs it most.

One company already has been able to replace 60 varieties of range convenience outlets with two basic models. It's meant better service, lower labor and mileage charges, and reduced inventory. Now the serviceman can do the job in one call. Likewise it has cut its surface switch inventory from 130 types to nine, pilot light types from 100 to 50 and 60 percolator pumps down to two basic pumps.

Training Job Tougher

Training of servicemen is another important aspect. In our study, training was cited as one of the biggest headaches. And it's not hard to see why when you consider the number of new gadgets and automatic features on the appliances that are available today.

For example, a man with training can change the belt on a certain type of automatic washer in less than 30 min. Without that special training even a good mechanic might need as much as four or five hr for the same job.

The training job is made doubly difficult when the serviceman can't get his hands on adequate training material. When a new appliance is marketed it often takes as long as six or seven weeks after release date to get instructional material. While he is waiting, he still has to make his service calls. He isn't quite sure what he is doing—through no fault of his own—so he must stumble and bluff his way through the repair. Needless to say, this doesn't make a very good impression on the appliance owner, and perhaps we lose a lot of good word-of-mouth advertising as a result.

The user has trouble with appliance instruction, too, although it is trouble of a slightly different sort. He—or more often she—doesn't always read the instructions even if she can understand them. Or perhaps she prefers to ignore them. Only distilled water should be used in steam irons, say the instruction manuals; and yet every month Detroit Edison gets hundreds of steam irons that are clogged completely because distilled water was not used. The instructions for washing machines always specify the max load limit. But we constantly are hearing about breakdowns because of overloading.

These are some of the major problems facing us in appliance service. What do we do about them? What kind of a program will improve the situation?

Joint Effort Needed

First of all, anything we do must be a joint effort. None of us—manufacturers, distributors, dealers, or utilities—can possibly do it alone. Therefore, plans now are being discussed to form a joint AEIC-National Electrical Manufacturers Association committee. This committee, comprised of members from various segments of the industry, would undertake a comprehensive study of the entire appliance service function. A formal meeting of such a group is contemplated for sometime this summer.

After a report is made (It is hoped for at AEIC's 1956 annual meeting next fall), subcommittees will tackle the individual service problems uncovered. From there it will be the general committee's task to prepare a final consolidating report and, most important of all, to offer a plan for action which can be followed.

Dealers, Jobbers Look for Service Helps

Dealers and appliance parts suppliers last month voiced some changes they would like to see in service policies. At the Appliance Parts Jobbers Association meeting in St. Louis, a speaker panel aimed its fire at these points:

1. The five-year warranty—On certain parts it entails too long a service period to be practical for dealers and distributors, they said.

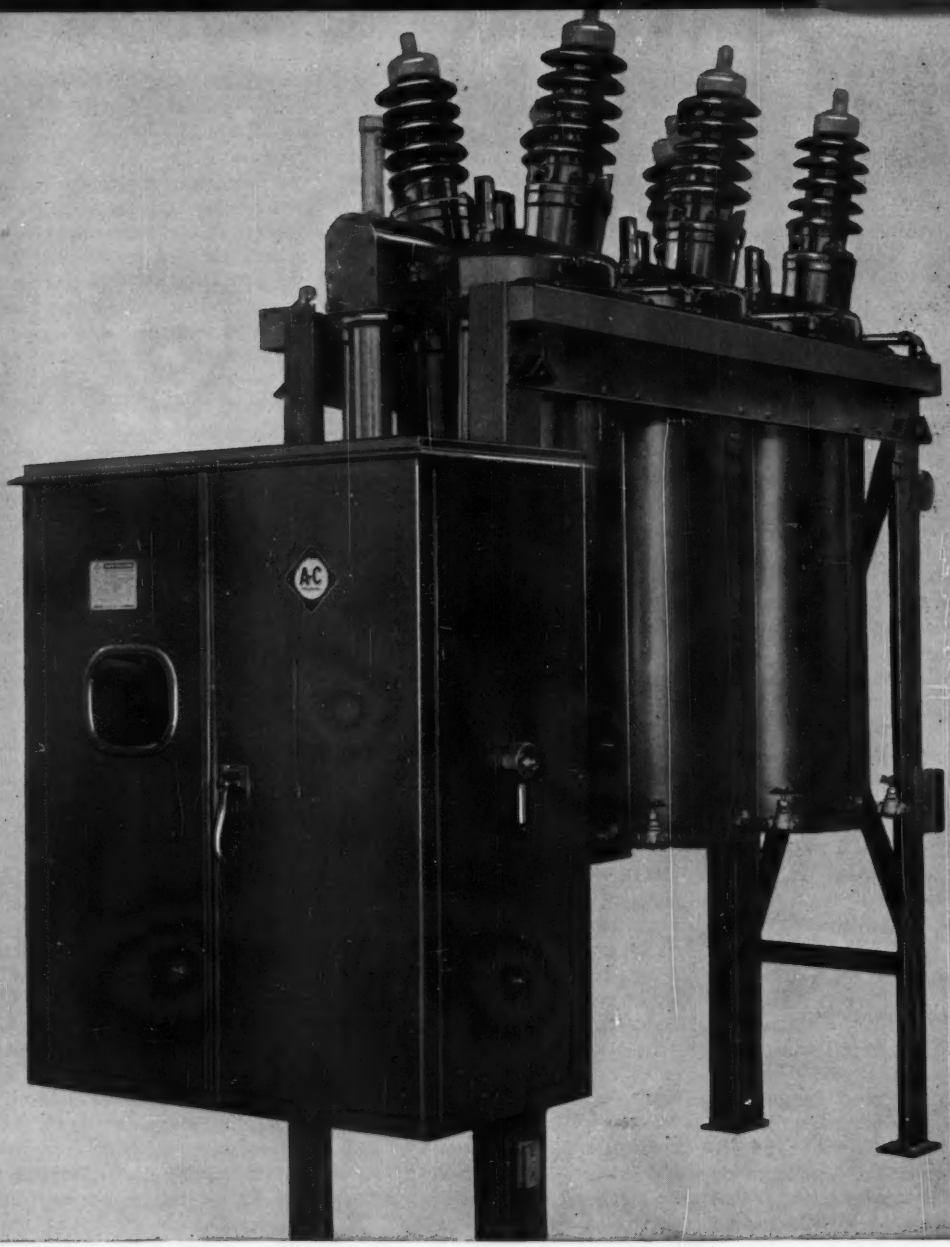
2. Free labor by dealer on faulty appliances—They want more help from the manufacturer.

3. Paper work involved in replacing parts—Too many forms and too much inconvenience, they complained, is costing the dealer too much money.

4. Self-Service—Dealers with suitable setups for handling service should receive adequate compensation, they argued, and should not be required to use central service agencies.

Dealers are "tremendously interested" in establishment of a 90-day warranty period for labor on major appliances, particularly washers, declared A. W. Bernsohn, managing director, National Appliance & Radio-TV Dealers Association. Among arguments for it, he said: 90 days is the auto industry's practice. Among reasons that may deter it: Sears, Roebuck & Co now offers a year's warranty.

Most NARDA dealers, said Bernsohn, are self-servicing. A sampling showed that 79% of members service major appliances, 78% radio, 76% television, and 71% housewares and other traffic appliances.



Now Pneu-Draulic Operators

At the request of numerous utilities, Allis-Chalmers design engineers have now made available to you *Pneu-Draulic* operators on smaller breakers.

Enjoy the simplicity and reliability of the *Pneu-Draulic* operator on your next breaker.

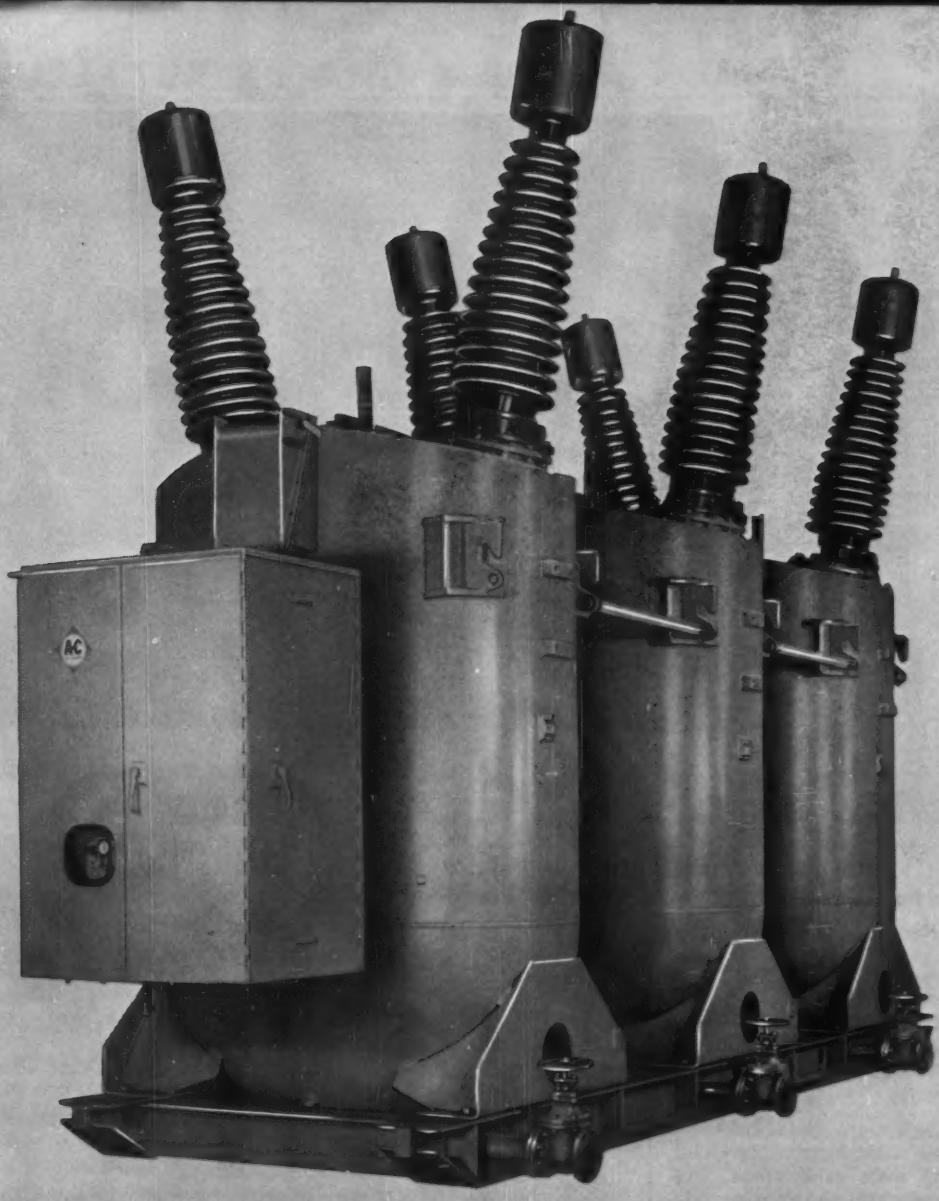
Acceptance of the *Pneu-Draulic* operator is based on the fact that it's as simple as it looks. It eliminates the mechanical problems inherent in previous mechanisms.

For complete information call your nearby A-C office or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Pneu-Draulic is an Allis-Chalmers trademark.

LIVE BETTER ELECTRICALLY

ALLIS-



for Breakers 500 Mva and Larger

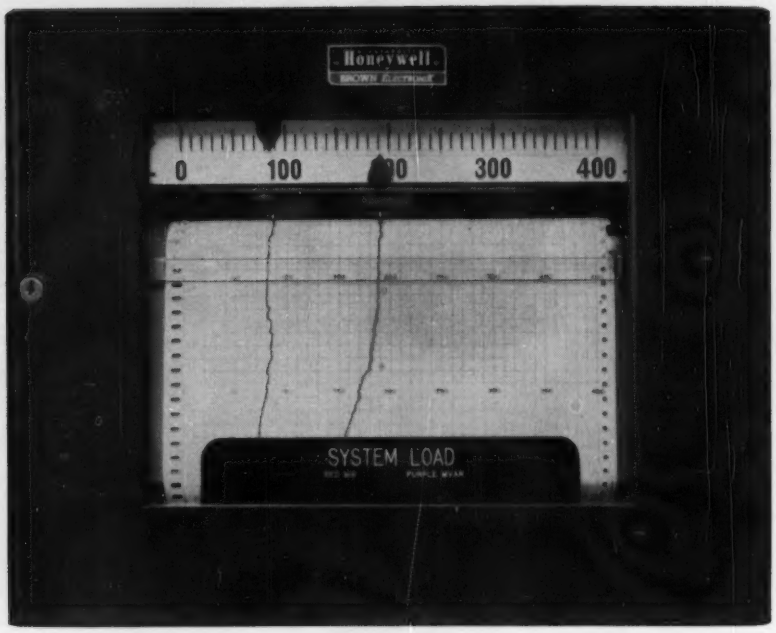
Features of *Pneu-Draulic* Operator

- Simple — Has fewer parts than other types of operating mechanisms.
- Eliminates moisture, corrosion, dust problems — entire system filled with oil containing inhibitor. Filtering eliminates dirt problem.
- Provides emergency closing — can be closed safely onto energized line when no control power is available.
- Mechanically trip-free.

CHALMERS

A-C ALLIS-CHALMERS

A-5006



Watts and vars at a glance

Choose from three different ways to record load data:

- ▶ both variables on a single chart and scale calibration; recorded in inks coded to match dual pointers (for the two-pen model illustrated above).
- ▶ both variables recorded on the same chart, but dual indicating scale calibrations that read watts and vars in the most convenient range for each.
- ▶ variables indicated and recorded on a split chart and scale . . . ideal for combining four records of watts and vars that would overlap if all appeared on the same chart.

The accurate, time-saving way to watch watts and vars is to see them on the same *ElectroniK* instrument. One instrument does the job of two . . . needs only half the panel space, half the chart paper.

You can have watts and vars recorded in the way most convenient for your particular needs. Both values can be indicated and recorded *continuously*, by a two-pen model. Or, a single-pointer instrument alternately prints watts and vars.

Either way, you're sure to profit by the accuracy, dependability, and serviceability for which *ElectroniK* instruments are famous, in power plants and industrial installations everywhere. Ask your local Honeywell sales engineer to talk over your specific application . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL REGULATOR CO., *Industrial Division*, Wayne and Windrim Avenues, Philadelphia 44, Pa.—in Canada, Toronto 17, Ontario.

● **REFERENCE DATA:** Write for new Bulletin 9070, "Instruments for Electrical Power Generation."

H HONEYWELL

MINNEAPOLIS **Honeywell**

BROWN INSTRUMENTS

First in Controls

Alcan's Big Unit

. . . an aluminum-wound transformer, slated for study

Aluminum Co of Canada has begun design and economic studies on the 70-Mva, 275/13.2-kv aluminum-wound transformer energized June 11 at its Kitimat, British Columbia, smelter (EW, Feb. 27, p 56). Alcan and the manufacturer, English Electric Co at St. Catharines, Ontario, expect the studies to provide data justifying future development of other large units.

The 3-phase, 60-cycle, oil-filled, transformer features h-v and l-v coils wound with 42 miles of aluminum conductor. It includes a tubular and rectangular aluminum busbar system, internal aluminum connections and finned aluminum tubing cooling units. The tank and bolted cover are made of steel.

The coils were wound in the same manner as with copper. About 11,000 lb of paper insulated conductor of Alcan's 1SCD rolled rectangular wire went into the transformer as well as Alcan 50SF rectangular bar and Alcan 50SF tubing. Core clamping plates were made from Alcan 57S plate and Alcan rod and sheet were used for miscellaneous applications. Windings are brought out of the coils and connected to the aluminum busbar system. Fusion joining methods were used.

To Increase Rating

In operation the windings are cooled by circulating oil through five heat exchangers around the outside of the tank. An extruded fin tube is used in a three-pass combination which is cooled by motor-driven fans. A sixth cooler can boost capacity to 76 Mva under emergencies. A seventh cooler can be added later to boost capacity to 79 Mva. The transformer oil capacity is about 12,750 gal.

The high-voltage winding has off-circuit, full capacity taps at about −10, −5, +5 and 10% of rated volts, controlled by an off-load switch. The low voltage is arranged so normal rated current can be obtained at 50, 75 and 100% of rated secondary voltage. Tapping current is about 1,800 amp. For tap changing, various tap leads go through the cover in 2,000-amp bushings. These are arranged so links can be altered at the top of bushings to obtain various tap voltages.

To build the transformer within limited height set by shipping and handling facilities, English Electric used five-legged core construction which reduced yoke sheet widths. Core sheets were insulated by the Insuline process which was developed by the manufacturer. The material has a china-clay base and is applied by automatic spraying.

Main terminals are brought out to the usual high and low-voltage porcelain outdoor bushings located on top of the transformer.

Who Said 'You Can't Take It With You?'

Instead of just toting a portfolio of drawings, specs and photographs, lighting engineers of Line Material Co hitch up a mobile display unit, set up shop near prospects' offices and proceed to show them the company's line as it looks above the street. The self-contained unit has a gas-driven 120-v generator. A segmented 25-ft aluminum standard lets engineers mount and light an incandescent, mercury vapor or fluorescent lamp and luminaire within minutes. And the eye-level panel displays other types of equipment to answer the question: "What kind of lighting job will it do?" The mobile unit is scheduled to fill customer requests.

$23-Million Expansion Set by GE Department

A five-year, $23-million expansion plan is slated by General Electric Co's medium steam turbine, generator, and gear department.

". . . In the years immediately ahead and over the forthcoming decade," said A. T. Chandonnet, department general manager, "it now appears that the volume of available land and marine business in our products . . . will be even greater than predicted two years ago."

Under the plan two new buildings

(*Continued on page* 56)

$23-Million Plan

(*Continued from page 55*)

will be erected and an existing one replaced by a new structure, providing about 173,000 sq ft of space. Construction starts late this year or early next year.

The department now produces steam turbine-generator units for both central power stations and industrial applications, marine turbines and reduction gears, mechanical drive turbines, and high-speed precision industrial gears. Wilbur L. Young has been appointed manager to direct the program. He is succeeded by Raymond J. Hennessey as department manager-manufacturing.

British Columbia Expansion Hinted by Canadian GE

Plans for expansion in British Columbia by Canadian General Electric were hinted by two top executives of the company during a flying inspection visit to Vancouver.

Although declining to give details now, James H. Goss, CGE president, said, "Our expansion plans are continuous. What we shall do here is just a matter of timing. We are continually studying the situation. But we're not ready to make any announcement at this time."

Goss, accompanied by H. M. Turner, board chairman, cited Canada's standard of living and industrial increases and said, ". . . we formulate our expansion plans on that basis." He said Canada's economy has been doubling every 10 years, and reported that both shipments and sales for the company are higher so far this year compared with 1955 when it grossed $218 million. The firm has nine plant locations and 25 manufacturing plants in Canada.

Pirelli Co Buys in Canada

Pirelli Co has invested capital in Canada. International Pirelli of Basle has reportedly purchased the majority holding of the stock of Cables, Conduits and Fittings, Ltd, of St. John, Quebec. The new name will be Pirelli Cables, Conduits, Ltd. This company's plant is to have an addition at an estimated $2 million for producing high tension cables. The Pirelli Co also plans, according to Rome news reports, to erect a $62-million copper processing plant.

American Brass Expands At Terre Haute Plant Site

Ground-breaking for a $25-million integrated aluminum mill was held recently by American Brass Co, wholly-owned subsidiary of Anaconda Co. The Terre Haute, Ind., fabricating facility is the parent company's second step into the product manufacturing field.

James F. Ackerman, vice president of Anaconda's Torrington, Conn., Division, will be in charge. Anaconda Pres John A. Coe noted that the company's Columbia Falls, Mont., plant, brought on the line last August, will be a source of supply for the new site.

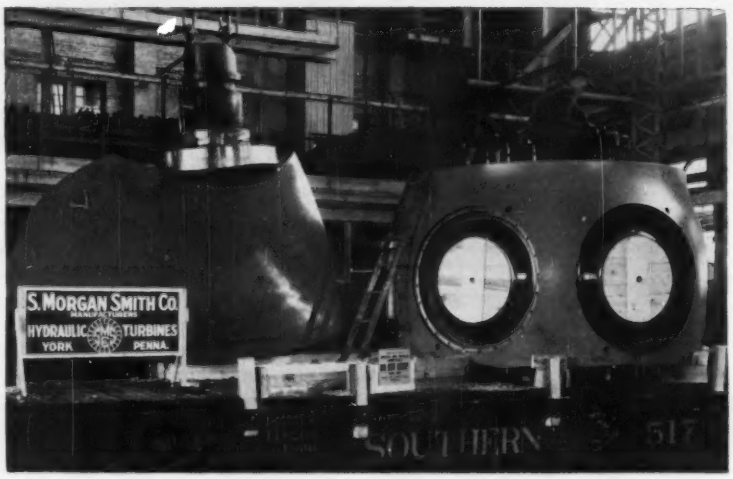
The new one-story mill, together with separate buildings for an office and research laboratory, will have in excess of 500,000 sq ft. It will be located on a 315-acre site, is expected to be completed in the fall of 1957, and will employ 1,000. In this mill will be cast aluminum ingots and billets, roll sheet and strip and extrude tubes, rods and special shapes.

West Is Still Included In Aluminum's Planning

Aluminum and the West are wedded for a bright future. This was the opinion expressed recently by Robert A. Sandberg, public relations manager of Kaiser Aluminum & Chemical Corp.

Sandberg told members of the San Francisco Electric Club that, regardless of how the Pacific Northwest's hydro problems are settled and regardless of Ohio River Valley's present advantages, the West as a whole is not viewed as being permanently out

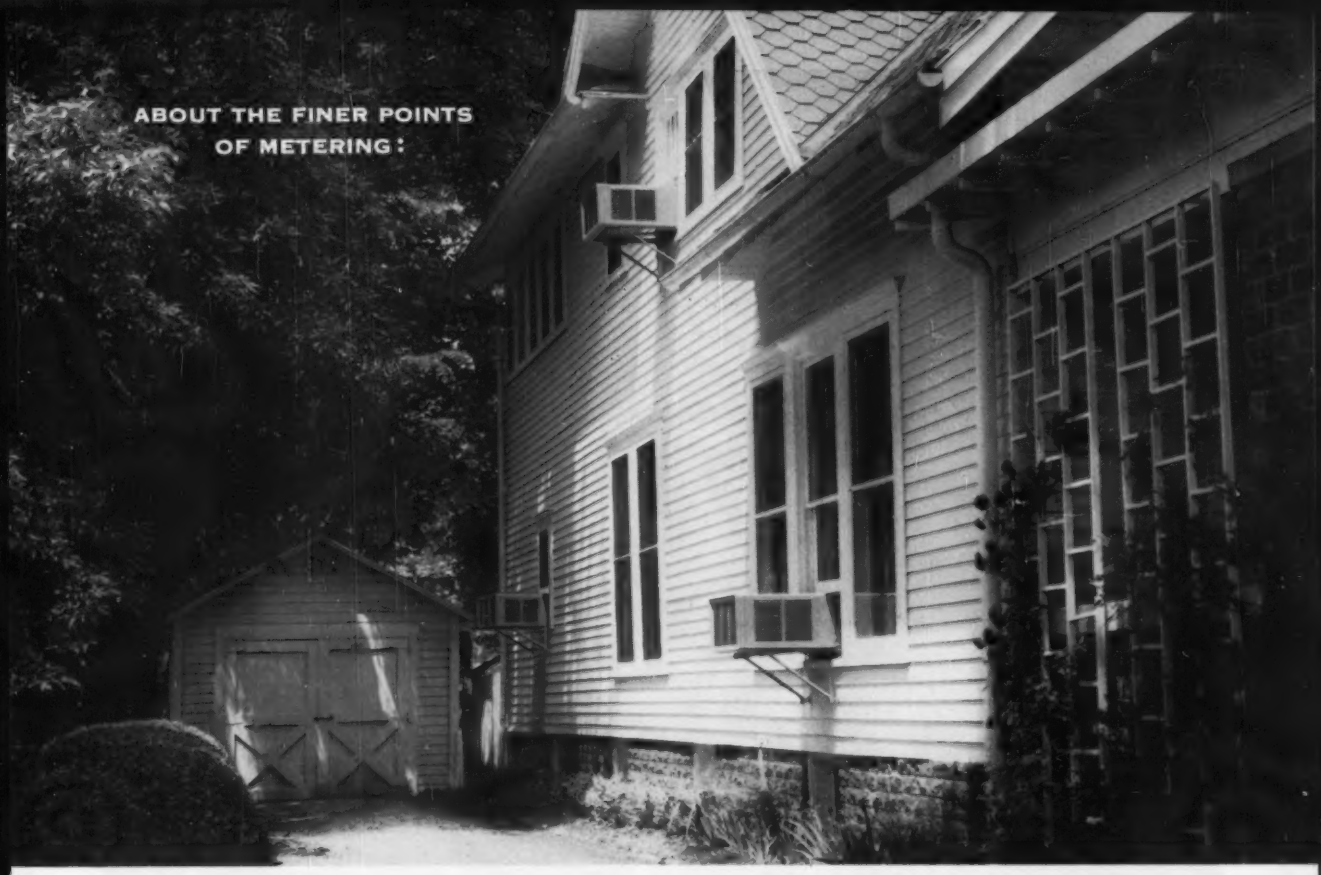
(*Continued on page 59*)



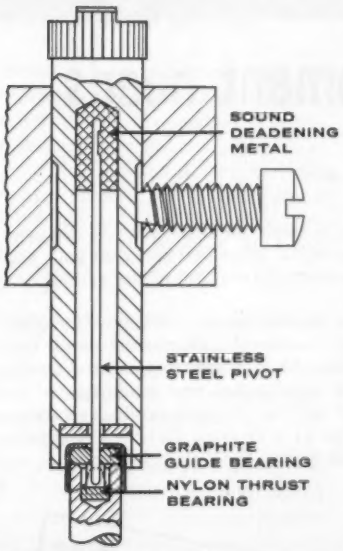
Final Turbine Shipped to McNary Dam

An S. Morgan Smith Co workman readies the hub of the last runner of 14 Smith-Kaplan turbines for shipment to McNary Dam on the Columbia River. At the left, one of six blades is being loaded. Called the most powerful Kaplan units now in operation, the hydraulic turbines are said to possess a field test output of 138,000 hp. The York, Pa., firm supplied all of them with three successive contracts, the most recent for six units having a completion date of July 1.

The $286-million, multi-purpose McNary project will have nearly 1-million-kw generating capacity when the last unit goes on the line late this fall. It was authorized in 1945, work started two years later, and President Eisenhower officiated at the September 1954 dedication.



For better protection against "heat storms"



UPPER BEARING SYSTEM

When the mercury goes up and air conditioners go on—other power loads go up too—and the disks of your watthour meters really start to spin!

Sangamo J2 Meters are equipped with bearing systems that are friction-free at both *bottom and top* of the disk spindle. (They'll even run upside down!) Upward thrusts of fast spinning disks are taken by a special nylon bearing in the top of the spindle.

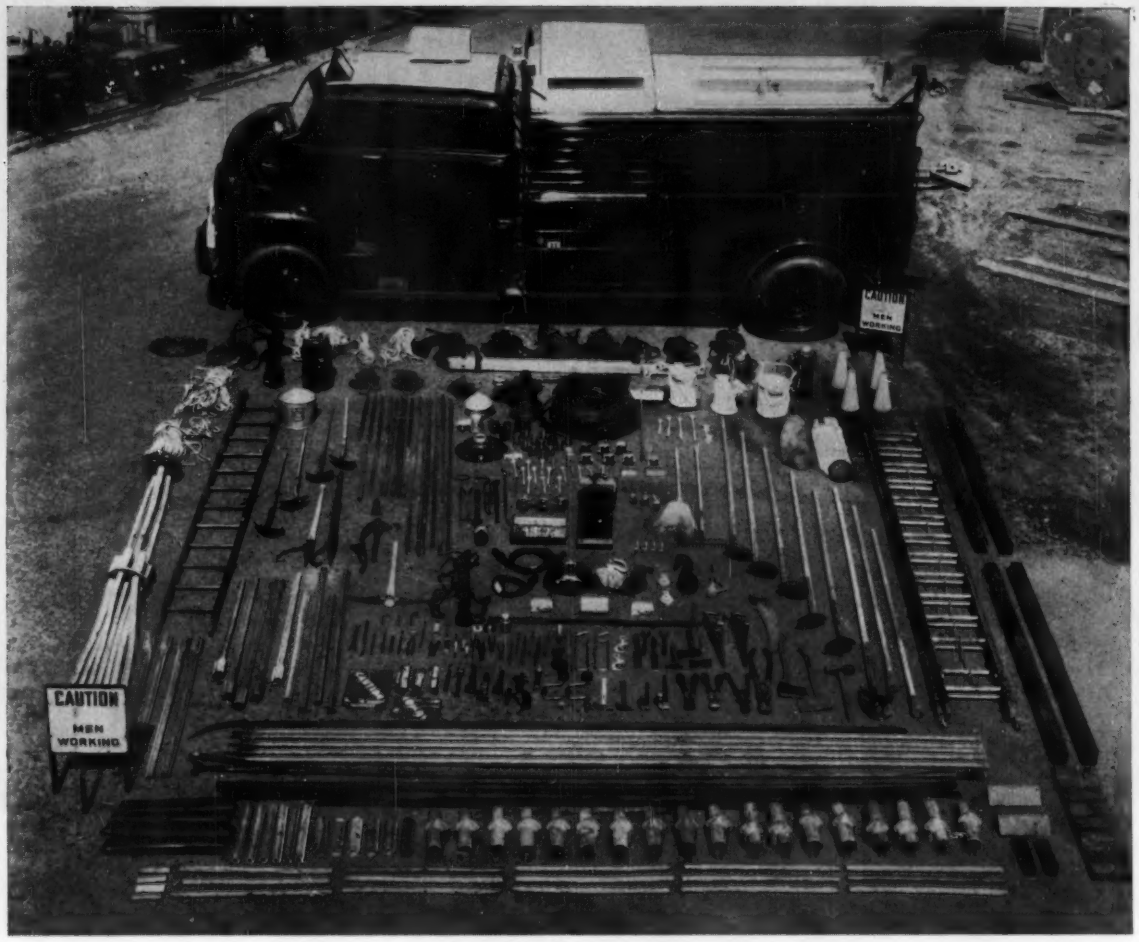
Heavy loads increase the wear on meter bearings because the torques tend to shift the axis of the disk. The J2 upper thrust bearing limits this change preventing increased wear at heavy loads.

The J2 meter's slow speed is another factor which gives Sangamo's bearing system a longer life. This general purpose meter makes only ten revolutions per minute at full nameplate rating . . . another reason why the J2 is your best investment in a watthour meter.

JM56-4

SANGAMO

ELECTRIC COMPANY Springfield, Illinois



Look at your line truck equipment needs from this angle . . .

Here's a poles-eye view of a typical utility line truck showing the wide variety of construction and maintenance tools and safety equipment your linesmen need for most day-to-day jobs. But—without exception—each and every item shown can be ordered conveniently from your nearby Graybar office or warehouse . . . and in every case you get the type and quality needed to assure speed and efficiency on the job *plus* long years of satisfactory service. All are products your linesmen know and respect—products that have been tried, tested and proven in the field by scores of companies just like your own.

Remember, when you order "via Graybar", you save the time and expense of multiple inquiries, for you can select, from this single source, the items best suited to your needs from among the products of over 200 of the nation's leading manufacturers.

Graybar is thoroughly familiar with utility requirements. Further, your nearby Graybar Representative stands ready to help as a convenient source of information on everything needed for pole-line construction and maintenance. And should you be faced with an out-of-the-ordinary problem, call on the experience of a Graybar Outside Construction Specialist for a consultation. We'll welcome your inquiry!

511-96

CALL GRAYBAR FIRST FOR . . .

Graybar Everything Electrical

GraybaR ELECTRIC CO., INC.
420 Lexington Ave., New York 17, N. Y.

IN OVER 130 PRINCIPAL CITIES

West Included in Planning

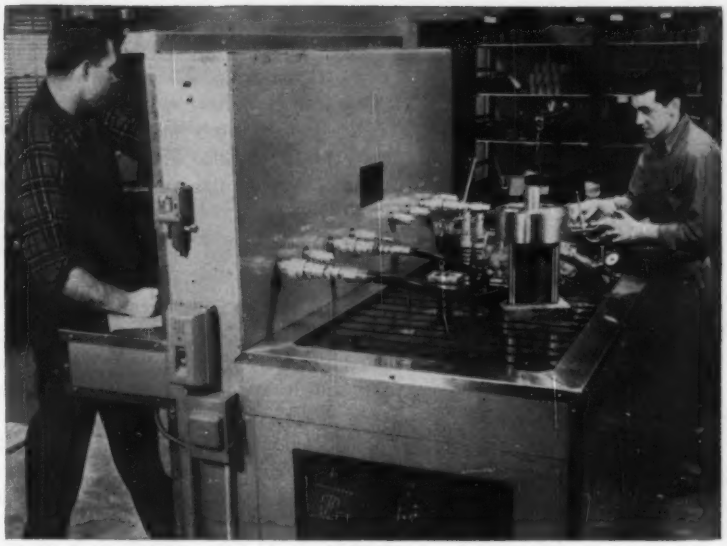
(*Continued from page 56*)

of aluminum's long range future.

The 11 western states contain more than one-third of the nation's recoverable coal and lignite reserves, most of its potential hydro, and no small proportion of raw material, equipment and know-how of atomic energy, he said.

Three major advantages of the Ohio Valley were given by Sandberg, advantages that now more than offset lower hydro costs in other areas:

1. Low-cost water transportation available for shipment of raw materials and products. **2.** Closeness to major markets for aluminum (Kaiser's reduction plant at Ravenswood, Ohio, is within 500 miles of over 70% of the aluminum market). **3.** Favorable price of coal-based power, with known long-range coal reserves, offers stability for aluminum production not possible with either hydro or natural gas.



A-C Boston Works Gets Hydraulic Tester

This hydraulic test bench was recently installed at Allis-Chalmers Boston Works for leak, hydrostatic pressure, flow and cycling tests of components used in the company's hydraulically operated circuit breakers. The bench does the work of what used to take several devices.

The tester has flow capabilities to 500 gpm with standard pressures from 0 to 5,000 psi and can provide hydrostatic pressures up to 20,000 psi. Its pressure switches and relief valves, the company says, can be preset and gauges calibrated for accuracy. The bench, viewed from the rear in above photo, was a cooperative venture with Hydraulic Engineering Co, Brookline, Mass.

M&M BRIEFS

Borg-Warner Corp has acquired the assets of Industrial Crane & Hoist Corp, a Chicago materials handling equipment manufacturer. Assets were purchased with an undisclosed number of shares of Borg-Warner stock.

Jones & Laughlin Steel Corp, in cooperation with Rea Magnet Wire Co, has developed a method to package magnet wire in steel pails. It is said to be economical, aid material handling, cut one bookkeeping phase and provide protective packaging. Applications for all types of wire are predicted.

Westinghouse Electric Corp . . . Recent developments include these items:

- Expects to spend between $300 and $375 million in a five-year program for heavy equipment and consumer product expansions.
- Lost fewer employees during the long IUE and UE strikes than during normal times; 95% of employees went back to jobs when work resumed. Losses were lowest among engineers and scientists.
- Saved money for Chicago's new O'Hare Field airport by installing remote control equipment which eliminated the need to relocate more than a mile of underground conduit. The savings—about $65,000.
- Obtained an order for an $11-million, 156,250-kw turbine-generator from Japan's Kansai Electric Power Co. A week later the last of three 75,000-kw units was loaded for shipment to Kansai; total cost for three units, $18 million.
- Shipped a 156,000-kw unit to Consumers Power Co's B. C. Cobb Station in Muskegon, Mich. It is one of the first to be delivered since the strike.
- Accepted National Safety Council's certificate of commendation for its Cheswick, Pa., atomic equipment plant where 2½ years have elapsed without a lost time accident.
- Slated a lightning arrester training program of four 2-hr seminars for electric utility engineers.

Electric Auto-Lite Co has purchased the business and plant of Reading (Pa.) Batteries, Inc, which becomes a division of the Toledo, Ohio, firm. Continued and expanded production of the division will be under present management and personnel, said J. P. Falvel, Auto-Lite president.

Long-Bell Lumber Co has converted a second pressure-treating cylinder to pentachlorophenol at its Joplin, Mo., location for treatment of utility poles, posts and lumber.

C. H. Wheeler Mfg Co has renamed its Cruse-Kemper Division in Ambler, Pa. It's now called Wheelerweld. The division fills the company's needs for weldments and sheet plate fabrication.

Holophane Co, Inc, has introduced a twin-tube, ceiling-attached luminaire for general indoor lighting. Called the "Realite," it features a molded element prismatic enclosure which is said to control light in all directions, providing a high level of downward light and eliminating glare.

BUSINESS OUTLOOK

Electrical World
JUNE 18, 1956

Republican optimism, which was becoming excessive, will now be a bit subdued. To be sure, if voters were logical, the President's new illness would actually *strengthen* his chance of reelection. What it chiefly showed, after all, was how excellent must be the condition of his heart to endure such a serious operation with so little sign of strain. But the public may not see it that way, and the health issue is now expected to loom even larger in the campaign.

• • •

Another check to Republican overconfidence is the renewed strength shown by Stevenson. This improves the odds that a party splitup can be avoided and that the candidate to be chosen will be able not only to unite the Democratic party, but to appeal broadly to the independent voter.

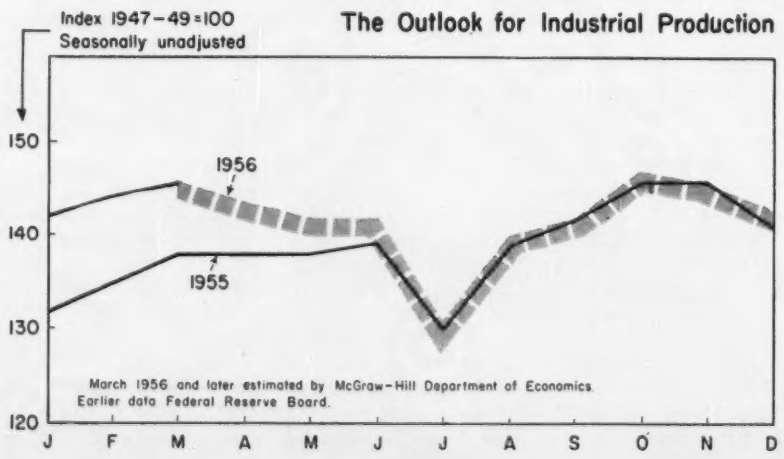
These developments, and the fact that there's still no sign of a spontaneous business pickup, may bring the Administration into a more receptive frame of mind about giving some stimulus to business before the election, by means of credit relaxation or tax cuts, or both. **It's hard to imagine that the experience of 1954 would be soon forgotten. At that time, control of Congress was lost after a one year decline of 13 points in the industrial production index. We've apparently already had at least a 3 point drop in 1956,** and the outlook is for more this summer unless something is done to stop it.

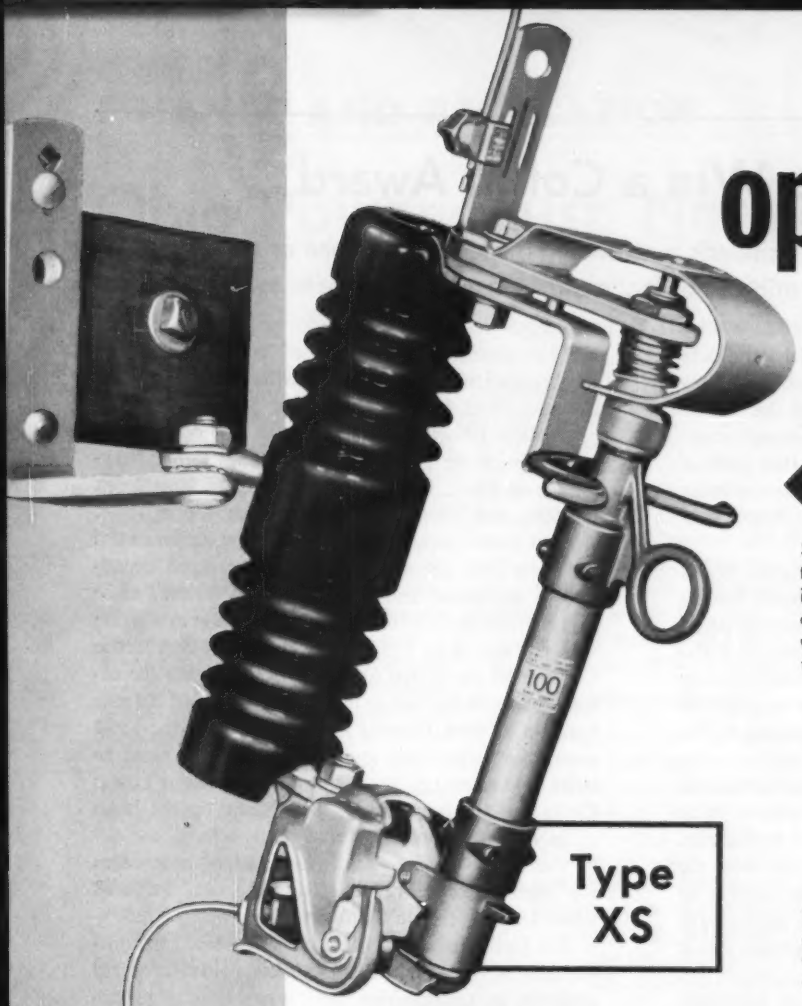
• • •

The chief immediate worry is inventories. The last 8 months manufacturer's inventories have been rising at an annual rate of around $6 billion. A normal and sustainable rate of growth wouldn't be more than $1.5 billion a year. So long as inventories were low relative to sales there seemed no immediate worry. But while inventories climbed, manufacturing sales remained nearly frozen. **Result: Inventories are now 175% of sales, compared to 163% last August.**

• • •

It's disquieting, too, that retail and wholesale inventories have now stopped growing entirely, and that retail sales have been slipping. This suggests that part of the growth in manufacturing inventories is now "involuntary": a backing up of goods that the market won't absorb. In the past this has been the prelude to inventory liquidation and a recession in business. **No policy changes seem likely though, until after the steel settlement.** It's hoped that the current slack in business will discourage excessive wage claims; or the pyramiding of rising costs. By then, though, it may be too late to get tax cuts through.





A SINGLE-VENTED

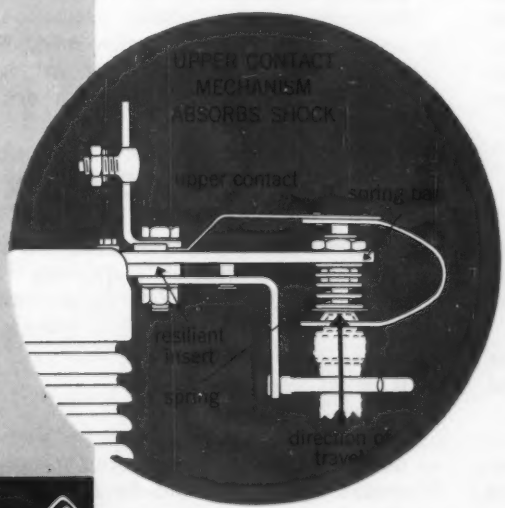
open cutout

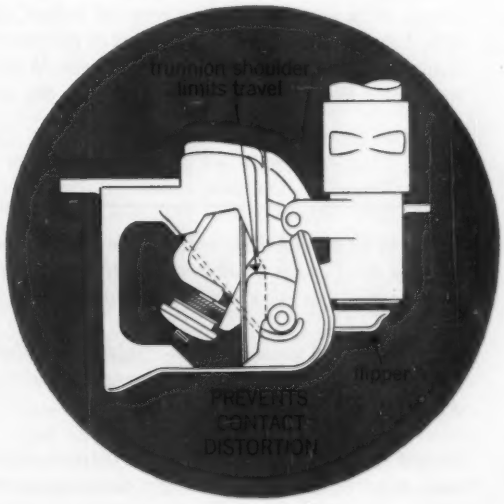
that will clear 12,000 amperes!

Significant new* developments by S&C now take the open cutout to exceptionally high levels of interrupting capacity without sacrificing low fault current interruption ability, without added cost, without double venting, and without disregard for linemen's safety.

- ✻ Controlled placement of fuse link shortens arc length — reduces gas generation.
- ✻ Multistep recoil action (from recoil bar, spring, resiliently mounted insert, contact) absorbs energy when fuse blows.
- ✻ Supplemental recoil action, when trunnion engages hinge casting, dissipates remaining energy.

The XS may be safely closed on 12,000 ampere faults (7.5 kv rating). And the patented "flipper" feature assures reliable interruption of low-current faults.





S&C

Specialists in High-Voltage Circuit Interruption since 1910

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POWER FUSES • DISTRIBUTION CUTOUTS AND FUSE LINKS • LOAD INTERRUPTERS • METALCLAD SWITCHGEAR

IN THE INDUSTRY

What It Takes to Win a Coffin Award

Highest industry honor demands outstanding achievement in one or more fields of company operations. Sales, expansion are good bets to win

Every electric company is a potential candidate for the Charles A. Coffin Award, symbol of outstanding achievement in the industry. But the winner must show accomplishment worthy of national attention and efforts far above the ordinary. Best general advice for competitors: Tackle the toughest challenge facing your company and follow it through to a successful conclusion.

This year the honor went to Washington Water Power Co for "extraordinary and enlightened leadership in a struggle for survival of free enterprise in the electrical industry." Specifically cited was the company's success in winning the Stevens County election which enabled the company to acquire the facilities of a public utility district operating in the county.

Since 1922 when the Coffin award was established, it has been presented for outstanding efforts in at least 11 other areas of electric company operations. In a number of instances, companies have won the award on the basis of achievements in several of these areas. In recent years, however, the judges have been inclined to place particular emphasis on a single outstanding accomplishment.

Aggressive sales and sales promotion programs appear to be a good bet for gaining the judges' attention. Efforts in this area have figured in the presentation of five of the 26 annual Coffin awards. Washington Water Power Co, for instance, won the award in 1939 partially on the basis of its sales efforts. In the depression year of 1933 Hartford Electric Light Co was cited for its range and all-electric home promotion. Effective sales programs also contributed to the award presentations to Wisconsin Public Service Co in 1940, Consolidated Edison of New York in 1936, and Tennessee Electric Power Co in 1934.

Next comes expansion activities. The Coffin award has gone four times to companies for rapid expansion of generation and other system facilities. Pacific Gas & Electric Co's billion dollar post-war expansion won the award in 1951. San Diego Gas & Electric Co copped the award for 1941 by satisfying the requirements of the fast-growing industrial and defense loads in its area. Electric Energy, Inc, won the 1952 award for organizing and building a vast plant to meet atomic energy requirements. And Idaho Power Co gained the honor in 1936 partially on the basis of its system expansion efforts.

The award has gone to a number of companies for general excellence. That was the case in 1948 when Union Electric Co of Missouri won.

The Coffin award has also been presented for outstanding achievement in these other fields: technical progress in transmission and generation, area development activities, public relations, managerial skills and company organization, safety, heroic duty under flood conditions, and credit and employee relations programs during a depression year.

TECHNICAL NOTES

Purity in all reactor core materials is very important because even traces of elements with a high capture cross-section can markedly affect neutron absorption.

Transmission of noise in a gas-insulated transformer is small because of the low compressibility and density of the gas.

Etched circuits on flexible sheets of laminated plastic insulation offer moisture and corrosion-resisting cables to connect control equipment.

Susceptibility to damage by ionizing radiation of materials depends upon the nature and strength of the chemical bond holding the atoms together or the amount of energy required to rupture it.

Ultrasonic testing reveals flaws in concrete structures up to 8 ft thick. Minimum propagation velocities for 100-kc are 12,500 ft per sec for prestressed beams, 14,300 ft per sec for prestressed anchors, 13,500 ft per sec for reinforced concrete buildings, and 15,500 ft per sec for suspended floors.

Power plant maintenance costs less when crew dismantling equipment includes skills to cope with every eventuality. Standby time for a few extra men is cheaper than calling them out after trouble is encountered.

Steep-wave flashover voltage is directly proportional to number of units in an insulator string, unlike critical flashover which corresponds to air distance.

Ohio Power Must 'Normalize' Taxes

PUC orders utility to credit tax deferral to reserve account; ruling reverses earlier disallowance of application for the restricted surplus method

In an accounting order which reversed an earlier disallowance of an application, the Public Utilities Commission of Ohio ruled that Ohio Power Co was to "normalize" taxes and to credit the tax deferral to a "Reserve for Future Federal Income Taxes."

In the petition which was disallowed on Sept. 9, 1955 the company had asked for a restricted surplus method of accounting. In its discussion, the commission said in reference to this matter: "In an application on the same subject matter filed by Cleveland Electric Illuminating Co, PUCO Case No. 25,731, the commission, in its order dated Dec. 29, 1955, was of the opinion that the tax reserve method was preferable to either the Depreciation Reserve or Restricted Surplus (capitalization) methods. The commission is still of the same opinion, as applicable to the facts in this case."

In its order, the PUC said ". . . applicant shall use the following accounting procedure:

"**1.** To account on its books for that portion of its properties which are the subject of accelerated depreciation pursuant to its election under Section 167 of the Internal Revenue Code of 1954 in the same manner as its other properties, and to accrue depreciation therefor at rates consistent with its rates for like property not subject to accelerated depreciation.

Accounting Plan Outlined

"**2.** During those years of the service life of any of its properties which are the subject of accelerated depreciation pursuant to its election under Section 167 of the Internal Revenue Code of 1954, in which a reduction of federal taxes on income results from the use of the accelerated depreciation deduction in lieu of the deduction allowable under the tax depreciation method heretofore followed, to charge to 'Provision for Future Federal Income Taxes', a subaccount under 'Taxes', and to credit to 'Reserve for Future Federal Income Taxes', an amount or amounts in total for each year equal to such reduction of taxes.

"**3.** Commencing with the year in which its deduction of depreciation for federal tax purposes in respect of any of its properties subject to accelerated depreciation is less than such deduction otherwise would have been if depreciation on such properties had been computed at rates consistent with its depreciation rates for federal tax purposes for like properties not subject to accelerated depreciation, to charge to 'Reserve for Future Federal Income Taxes', a subaccount under 'Taxes', an amount or amounts in total for each year equal to the increase in federal income taxes resulting from such lower federal tax depreciation deduction."

Rockslide Buries Schoellkopf

(*Continued from page 9*)

Gas & Electric Corp, and others. Company officials reported no curtailment of 25-cycle service had been necessary. They said that 25-cycle equipment at Huntley and 80,000 kw of 25-cycle equipment at Adams Plant were in full operation. In addition 225,000 kw of 25-cycle was being purchased from Ontario Hydro, they said.

Loss of Schoellkopf Station's 371,000 kw of capability more than wipes out the 8.4% (333,648 kw) margin of reserve generating capacity that existed in the Upstate New York Power Pool (3,972,300 kw) at the time of the December 1955 winter peak. However interconnections with Ontario Hydro-Electric Power Commission of Canada and U. S. utilities offer opportunities for relief from possible shortage conditions this winter. With the release of some 20,000 cfs of water formerly taken by Schoellkopf, a basis is available for negotiating an energy interchange agreement with Canadian utilities to cover near term needs, it was pointed out.

As of April 1956 capacity of the Upstate New York Power Pool was 4,292,000 kw against an April peak of 3,619,000 kw. This monthly peak will decline until August when it will start climbing to a December high, usually some 700,000 kw above the summer peak. About 30,000 kw of new hydro capacity has or will be added to the pool this year. When disaster struck, Niagara Mohawk had 400,000 kw of new steam capacity scheduled to come in during or before 1958; 200,000 kw in 1957 and 200,000 kw in 1958. In addition 37,400 kw of hydro will be added in 1957.

Advocates of a state owned power plant on the Niagara River seized on loss of Schoellkopf to press for passage of the Lehman bill at this session of Congress. The bill passed the Senate a month ago and is before the House Public Works Committee. This was the action on the political front last week:

- Gov Averell Harriman called on the White House to order "an immediate comprehensive survey and provide necessary remedial measures in this location."
- Sen Herbert H. Lehman said: "The disaster makes it imperative that we press ahead on the Lehman bill."

Future Financing

This feature appears on this page every two weeks.

Some debt issues scheduled for June were postponed because of market conditions—C. I. T. Financial $75 million debentures and Ohio State Turnpike $386 million bonds.

Utilities do not expect the investment bankers to take their vacations in July this year. They have already scheduled sales of $130 million new issues this month. On top of which the $250 million American Telephone & Telegraph issue will be offered on the 10th.

August has two large financings scheduled. One of these had originally selected July but moved to this month.

These usually empty summer months are now comfortably filled with securities offerings.

Due Diligence Meetings:
June 20, Elizabethtown Water Co; June 28, Florida Power Corp; July 2, Pacific Power & Light Co; July 13, Union Electric Co; July 26, Jersey Central Power & Light Co, and Aug. 22, Consolidated Natural Gas Co.

(Furnished by the Irving Trust Co from the "Financing Calendar")

DATE	COMPANY	Amount of offering (millions) DEBT	EQUITY
JUNE			
18	Pacific Gas & Electric	$.....	$37.5-N-rt-COM
19	Public Service of New Hampshire	8.0-C	.....
19	Western Massachusetts	.....	4.0-N-COM
19	Combustion Engineering	15.0-N-cv	.....
26	Elizabethtown Water	7.5-C	.....
JUNE			
No Date	Halliburton Oil	.....	25.9-N COM
	PHA	110.0-C	.....
	Atlanta Gas Light	.....	2.0-rt COM
	Washington PUD	163.0-N	.....
2nd Quarter of 1956 (Month not indicated)			
	St. Regis Paper	.....	23.2- -rt COM
	Dade County Florida	34.5-C	.....
	Central Vermont Public Service	1.8-N	0.7-N COM
	Northern Indiana Public Service	12.0	.....
	City of Dallas	40.7	.....
	Washington State Toll Bridge	227.0-C	.....
	Oklahoma Turnpike	63.0-C	.....
	Federal Land Banks	60.0	.....
	Atlanta Gas Light	5.0-C	.....
	Western Kentucky Gas	6.0-P-R	.....
JULY			
2	Florida Power	20.0-C	.....
10	American Telephone & Telegraph	250.0-C	.....
11	Pacific Power & Light	.....	9.3-C-rt COM
17	Union Electric Co	35/40.0-C	.....
24	Illinois Power	20.0-C	.....
31	Jersey Central Power & Light	10.0-C	.....
JULY			
No Date	Florida State Turnpike Authority	185.0-N	.....
	Tennessee Gas Transmission	30.0-N	.....
	Michigan-Wisconsin Pipe Line	10.0-C	.....
AUG.			
15	U. S. Governments	12,500.0-R	.....
21	Pacific Telephone & Telegraph	78.0-C	15.6- -rt COM(1)
28	Consolidated Natural Gas	30.0-C	.....
29	Tampa Electric	10.0-C	.....
SEPT.			
10	Gulf States Utilities	15.0-C	3.0-C COM
11	Carolina Power & Light	15.0-C	.....
17	U. S. Governments	1/6,200.0-R	.....
25	Virginia Electric & Power	20.0-C	.....
SEPT.			
No Date	Southern Counties Gas	15.0-C	.....
	Pennsylvania Tunnel	25.0-C	.....
3rd Quarter of 1956 (Month not indicated)			
	Ohio Power	28.0-C	.....
	California Toll Bridge	34.0-C	.....
	South Carolina Electric & Gas	5.0-P	.....
	Consumers Power	30.0-C	.....
	Northern States Power	20.0-C	.....
	Rochester Gas & Electric	.....	5.0-N-Pfd
	Texas Eastern Transmission	.....	15.0-N-Pfd
	Detroit Edison	60.0-C-cv-rt	.....
	U. S. Governments	2/4,000.0*	.....
	Kansas-Nebraska Natural Gas	5.5-P	.....
	Metropolitan Edison	.....	5.0-C-Pfd
	J. P. Stevens	30.0-N	.....
	U. S. Rubber	50/60.-cv-rt	.....
	Michigan-Wisconsin Pipe Line	.....	15.0- -Pfd
	CIT Financial	75.0-N	.....
OCT.			
2	Columbia Gas System	30.0-C	.....
16	Public Service of Indiana	30.0-C	.....
OCT.			
No Date	Delaware Power & Light	.....	6.0-C
	New England Power	10.0-C	.....
	North-South Indiana Toll Road	220.0-C	.....
	California Electric Power	6.0-C	.....
NOV.			
No Date	Transcontinental Gas Pipe Line	20.0-P	.....
	Long Island Lighting	20/25.0-C	.....
DEC.			
3	U. S. Governments	9,100.0- -R	.....
DEC.			
No Date	Appalachian Electric Power	24.0-C	.....
	Essex County Electric	20.0-C	.....
4th Quarter of 1956 (Month not indicated)			
	Tennessee Gas Transmission	50.0-N	.....
	Kansas City Power & Light	20.0-C	.....
	Texas Eastern Transmission	15.0-N	.....
	Otter Tail Power	5.0-N	.....
	Northern Natural Gas	20.0-N	.....
	Philadelphia Electric	30.0-C	.....
	Central Illinois Light	.....	8.0- -Pfd
	Southern Union Gas	.....	3.0- -rt COM
	Columbus & Southern Ohio Electric	.....	some Pfd
	U. S. Governments	0/2,000.0*	.....

Symbols: C-Competitive; N-Negotiated; P-Private; R-Refunding; cv-convertible; rt-Rights; Pfd-Preferred; COM-Common. (1) Does not include amount to be offered to parent company. *Estimated

Think of it! 1000 feet of #6 copper weatherproof costs you $54.43...but 1000 feet of Kaiser Aluminum #4 polyethylene weatherproof wire costs you only $30.00! That's an enormous saving! And in addition, KAISER WIRE field, engineering and research services can help you save more money in handling, construction, maintenance. Contact us . . . or one of our many distributors.

COST COMPARISONS
(Based on prices in effect 5/15/56.)

ALUMINUM		COPPER	
#4 solid PE (2/64")	$ 30.00 —	#6 solid DBWP*	$ 54.43
#2 strand PE (3/64")	$ 47.50 —	#4 solid DBWP*	$ 80.08
#1/0 strand PE (4/64")	$ 77.00 —	#2 strand DBWP*	$133.16
#4/0 strand PE (4/64")	$152.00 —	#2/0 strand DBWP*	$260.91

Delivered price on quantities of 20,000 lbs. or more.

Point of shipment price on 30,000 lbs. or more. Freight adders extra.

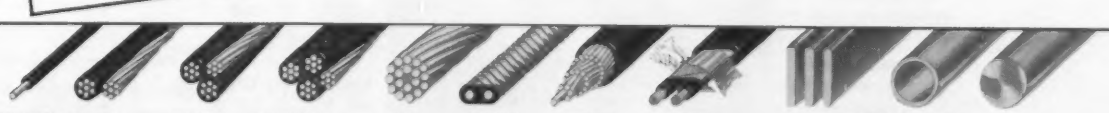
*Hard drawn, Double Braid URC.

ALUMINUM IS THE ANSWER TO ADEQUATE WIRING

KAISER WIRE FOR BIG SAVINGS

Kaiser Aluminum & Chemical Sales, Inc.
Executive Office, Kaiser Bldg., Oakland 12, California; *General Sales Office*, Palmolive Bldg., Chicago 11, Illinois.

Kaiser Aluminum



WEATHERPROOF DUPLEX TRIPLEX QUADRUPLEX
NEOPRENE • POLYETHYLENE • "TWO-SHOT" • SOLID OR STRANDED AAC, ACSR OR AAAC (ALL ALUMINUM ALLOY CONDUCTOR)

ACSR ALL-ALUMINUM OR AAAC

ARMORED SERVICE DROP

BUILDING WIRE & CABLE

SERVICE ENTRANCE CABLE

BUS CONDUCTORS
RECTANGULAR BAR
TUBULAR CONDUCTOR
SOLID ROUND BAR

STATISTICS

Generation in First 3 Months Tops '55 Period by 16.2%; Sales Up 15.8%

(In Millions of Kwhr)

In three months ended March 31, utilities . . .		Of the total, utilities sold . . .
Generated . . .	149,451 (16.2% over '55)	36,290 to residential customers (12.0% more)
	117,691 by fuel (up 17.4%)	2,145 to rural customers (11.4% more)
	31,760 by hydro (up 11.8%)	20,841 to commercial customers (9.9% more)
		67,897 to industrial customers (21.2% more)
Imported . . .	473	1,268 to street & highway lighting customers (8.5% more)
		2,673 to other public authorities (7.7% more)
Less . . .	3,830 used by producer	683 to street and interurban railways (4.4% less)
	437 in company use	546 to electrified railroads (1.5% more)
	13,173 lost and unaccounted for	141 for interdepartmental users (0.6% more)
Leaving . . .	132,484 in sales to ultimate customers (15.8% higher)	

Source: Edison Electric Institute

Power Statistics . . .

		Latest Month	Preceding Month	Year Ago	Annual Change %
Capacity	Mar.	116.56	115.59	104.93	11.1
Peak—Class I Systems (million kw)	Mar.	92.3	94.2	83.4	10.7
Estimated Dec. '56 Peak (million kw)	Mar.	105.68	105.56	103.41	2.2
Production—billion kwhr	Mar.	50.34	47.99	44.45	13.3
Hydro		11.78	10.63	10.40	13.3
Fuel		38.56	37.36	34.05	13.2
Sales—billion kwhr	Mar.	45.36	45.41	39.86	13.8
Residential		12.42	13.02	11.13	11.6
Commercial		6.84	6.89	6.20	10.2
Industrial		23.69	23.21	20.25	17.0
Other		2.40	2.28	2.28	5.3
Fuel Consumption	Mar.				
Coal—million tons		13.39	13.44	11.51	16.3
Oil—million barrels		6.22	7.10	6.81	−8.7
Gas—billion cu. ft		85.17	67.81	83.41	2.1
Net Income Class A & B Co's—$ million	Mar.	117.46	129.26	105.23	11.6
Residential Customers—millions	12 mos.	44.60	44.51	43.34	2.9
Revenue per kwhr	ended	2.63¢	2.64¢	2.68¢	−1.9
Avg kwhr per customer	Feb. 29	2,799	2,778	2,587	8.2
Avg annual bill		$73.67	$73.34	$69.33	6.3

Business Statistics . . .

Indexes: 1947–49 = 100					
FRB Industrial Production	April	143	143	138	3.6
ENR Construction Cost	May	144.4	143.2	137	5.4
BLS Cost-of-living	Mar.	114.7	114.6	114.3	0.4
NEMA Sales	Mar.				
Insulation materials		168	163	160	5.0
Electric appliances		120	109	117	2.6
Wholesale prices	Mar.				
Motors and generators		126.9	126.6	120.5	5.3
Transformers and regulators		133.1	131.2	127.3	4.6
Switchgear and fuses		147.8	147.5	135.5	9.1
GNP—annual rate—$ billion	1st Qtr.	398.5	397.3	375.3	6.2

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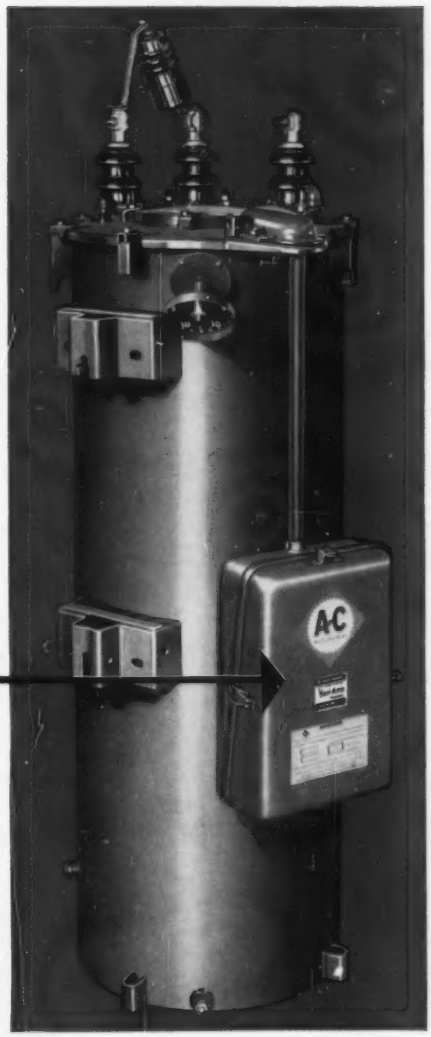

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